

Subterranea



Subterranea Britannica is a society devoted to the study of man-made and man-used underground structures and the archaeology of the Cold War. The society is open to all and its membership includes all walks of life. Members are invited to contribute to this magazine even if this just means sending very welcome snippets from newspapers and magazines.

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Front cover photo: The Manchester & Salford Junction Canal tunnel beneath Granada studios in Manchester in March 2015. During WWII the tunnel was drained and divided into bays during conversion into an air-raid shelter. A wardens' lookout post is seen near the entrance at Grape Street. A plan drawn up at the start of WWII shows there were five of these posts along the tunnel, and a first-aid section just below Deansgate. Ironically this was next to the main sewer and there were reported cases of scarlet fever. The section of canal tunnel under Granada ends at this bay. Beyond the wall the tunnel is under the Great Northern Warehouse retail and leisure centre. This further section of tunnel is occasionally open to the public and was visited by Sub Brit during the Manchester Weekends in 1994 and 2011. Photo Nick Catford

Back page upper: Sub Brit party outside the entrance to the Osowka tunnel complex on the Project Riese visit to Poland in October 2014. Photo Mike Scott

Back page lower: Looking along the west entrance tunnel into the Fan Bay Battery deep shelter near Dover in March 1995. The west entrance tunnel is cut through unlined chalk and supported by timber props. The shelter tunnels are supported by steel rings and lined with corrugated-iron sheeting. The shelter was designed to accommodate four officers and 185 other ranks. Photo Nick Catford

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Newsletters of Subterranea Britannica are published by the committee of Subterranea Britannica. Original articles, book reviews, press cuttings, extracts from books and journals, letters to the Editor etc are welcome.

However the Editor reserves the right not to publish material without giving a reason.

The committee of Subterranea Britannica and the Editor do not necessarily agree with any views expressed and cannot always check the accuracy of any material sent in.

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Chairman's Welcome

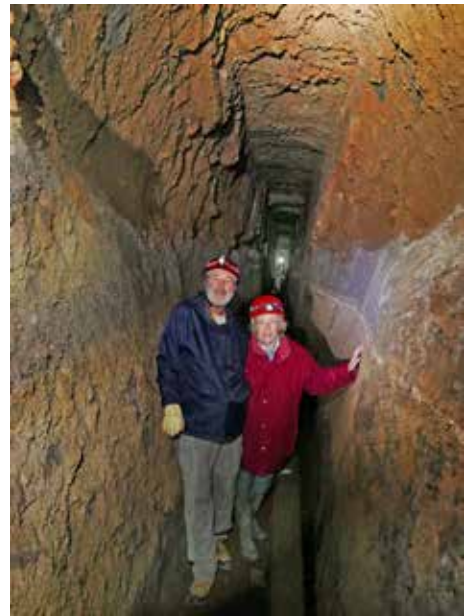
Martin Dixon

I'm writing this having been inspired by two recent underground excursions – one in the UK and one in Italy. The UK trip was to Kent and ably organised by Chris Rayner. It included visits to Fan Bay Battery and the Ramsgate Tunnels. What makes these two sites particularly exciting is that they have both recently undergone restoration by volunteers and are accessible once more after many years of closure.

For Fan Bay, we owe huge thanks to Sub Brit member Jon Barker, who is also the National Trust Manager responsible for the site. Jon personally championed the excavation and low-intensity restoration of the site. Jon and his team of volunteers (including many other Sub Brit members) have worked wonders in revealing not only the World War II coastal artillery shelter but also the earlier sound mirrors which are quite spectacular. Unlike many other NT sites there is minimum fixed interpretation and no modern lighting installed. The site will open for public visits later in 2015.

Ramsgate Tunnels have also been reopened to the public after sterling work by a local group. The original railway tunnel was built in 1863 and after closure of the mainline became a scenic railway in 1936. In the lead-up to World War II an immense network of deep shelter tunnels was built to house 60,000 people. A Sub Brit visit took place in July 1997 but after that the site was designated (wrongly in my view) as a 'confined space' by the local authority. Full marks to the Ramsgate Heritage Regeneration Trust for working to get this fascinating site reopened. More details of both these Kent sites are in the article elsewhere in this edition of *Subterranea*.

These two sites are also examples of how Sub Brit has been able to make grants to help support underground



Martin and Linda Dixon deep underground in the 2,500 year-old Nemi drain in the Alban Hills outside Rome. The tunnel of 1,653 metres was excavated without intermediate shafts and is still accessible today. Photo Professor Boaz Zissu

projects and structures around the country. When we were accepted by HMRC as able to claim Gift Aid, the Committee agreed that we should use the extra money to help worthy projects that benefit the public. At Fan Bay in 2014 Subterranea Britannica gave £2,000 to support the project and gave a further donation after the recent visit. In the case of Ramsgate Tunnels we rounded up members' entry fees to provide further support for their endeavours.

Further afield, a small Sub Brit group attended *Hypogea 2015* in Rome. Over 100 delegates from 12 countries gathered to hear presentations (in English) about underground sites across the world and to visit some key locations in (or rather under!) Rome and the surrounding area. From the earliest days of Sub Brit our international relationships have been excellent and it was great to renew old friendships and make new contacts. I sit on the UIS (International Union of Speleology) Artificial Cavities Commission which brings enthusiasts from many countries together and the exciting news is that *Hypogea 2017* will take place in Cappadocia, Turkey from 6-10 March 2017. I hope many Sub Brit members will put the date in their diary and in due course attend the event.

So two positive signs from home and abroad that show interest in our underground heritage is high and is being converted into positive action to preserve and open sites for future generations.

Wherever your travels in 2015 take you – whether Ramsgate or Rome, Hack Green or Hamburg – I hope you enjoy a good year underground. I look forward to hearing and reading about your experiences and to raising a glass with many of you.

chairman@subbrit.org.uk



Sub Brit Treasurer Tony Radstone (centre) alongside Chairman Martin Dixon hands over the Sub Brit grant of £2,000 towards the restoration work at Fan Bay to Jon Barker of the National Trust. The handover took place over the Heritage Open Day weekend at the top of South Foreland Lighthouse!

Photo Adrian Armishaw



SUBTERRANEA BRITANNICA DIARY

Summary of Forthcoming Events

Sub Brit specific events

2015

- 15 - 18 May Study Weekend, Hamburg
- 9 May Paddock Open Day (CART)
- 4 June Paddock open day
- 27 June SB Committee meeting
- 1 July Copy deadline for *Subterranea* 39
- 18 - 19 July Cuckfield ROC Open Days
- Late August *Subterranea* 39 published
- 4 - 7 September UK Study Weekend, Gloucestershire
- 19 September Paddock Open Day
- 10 October SB Autumn meeting
- 17 October SB Committee meeting
- 1 November Copy deadline for *Subterranea* 40
- Mid-December *Subterranea* 40 published

2016

- 16 January SB Committee meeting
- 1 March Copy deadline for *Subterranea* 41
- 23 April SB AGM & Spring Meeting, London
- Late April *Subterranea* 41 published

Other underground-related events

2015

- 25 April SERIAC conference, Southampton
- 9 May, 13 June, 11 July, 8 August, 12 September Reigate Caves public open days
- 22 - 25 May NAMHO Conference – Nenthead, Cumbria
- 27 June Hack Green Cold War Friends Day, Nantwich, Cheshire
- 11 - 26 July CBA Festival of Archaeology
- 10 - 13 September Heritage Open Days, England
- September (runs throughout month) Open Doors, Wales <http://cadw.wales.gov.uk/events>
- September (dates vary by region) Doors Open Days, Scotland
- September (TBC) European Heritage Open Days, Northern Ireland
- 19 - 20 September Open House London
- 25 - 27 September Hidden Earth National Caving Conference, Bristol
- 2 - 4 October SFES Congress, St-Bonnet-le-Courreau, France

For web links to these events please visit www.subbrit.org.uk/events
or contact the Society concerned

*If you know of other relevant events run by other societies, please let us know
so that they can be advertised in the next edition and on the website*



Notes of SB Committee Meeting 17 January 2015

Roger Starling, Secretary

Chairman

Martin Dixon said that the Annual Return had been filed at Companies House. He took the opportunity to thank Andrew Smith and Mark Russell, who were both standing down from the committee at the AGM, for all that they had contributed to the success of Sub Brit. He was pleased to announce that two new members – Chris Wilkins and Tim Wellburn – had agreed to stand for election in their place. The chairman reported an approach he had received from the Airfield Research Group, suggesting that there might be opportunities for links between the two organisations, and that a meeting/site visit would be arranged. The Chairman also reported on the progress being made in arranging a number of overseas visits, and on access to a number of UK locations.

Finance

Tony Radstone reported that Subterranea Britannica finances remained in a very satisfactory position, and that support for a number of projects was in hand, including equipment for KURG, with other submissions expected. He reminded members that funds were still readily available for any new projects approved by the committee.

Subterranea 37

Nick Catford reported that *Subterranea 37* had been printed and despatched well within the schedule, and that the new style “perfect” binding had been welcomed by the majority of members. He said that *Subterranea 38* was in production, and would include a wide variety of subjects of interest to members. The committee considered some design proposals for improving the cover and inside pages of *Subterranea*, and it was agreed that these would be implemented with the next issue.

Meetings & Visits

Chris Rayner reported that the Autumn Meeting and visits day had both been very successful, and that everything was in hand for the Spring Meeting and AGM. The Autumn 2015 meeting would be held on Saturday, 10th October, and the Spring 2016 Meeting and AGM would be held on 23rd April. The proposed UK Study Weekend 2015 to Gloucestershire is being developed with local reps; ideas for 2016 were discussed. The visit to Hamburg in May had now been confirmed, and a number of other destinations such as Poland, the Czech Republic, Denmark, Italy and Gibraltar were being considered for the future. Some of these visits might be private groups, rather than official Subterranea Britannica activities. The visit to a group of Essex sites, including the Gunpowder Mills, had proved very popular. Other visits, including Clapham South and the Aldwych Tube, were still in planning.

Membership

Nick Catford reported that there had been a steady stream of membership renewals, and that the total to date was ahead of the comparable time in 2014. A renewal reminder would be sent to any outstanding members at the beginning of March. There had been a few minor glitches with the CiviCRM system, but these had been speedily resolved.

Webmaster

Richard Seabrook reported that the Forum was now working well, with more than 500 members subscribed. The website continued to attract large numbers of visits, and the on-line shop was making a significant contribution to Subterranea Britannica funds.

The next committee meeting will be held on 27 June 2015; any members wishing to raise any matter should do so in writing to the Secretary at least two weeks before.

Sub Brit on eBay

Readers may be interested to know that we have recently registered Subterranea Britannica on eBay as an ‘eBay for Charity’ partner. This means that anyone can nominate Sub Brit to receive a percentage (between 10 and 100%) of the proceeds of any eBay sale. More general information is on the eBay website



Our own home page from which you can initiate a sale is at:
http://donations.ebay.co.uk/charity/charity.jsp?NP_ID=64157

There's no pressure to do so but any money received will, of course, be used for our charitable ends



News

Miscellany compiled by Nick Catford & Paul Sowan

NEWS – ARCHAEOLOGY

Reigate cave days 2015

The Wealden Cave and Mine Society offers guided tours of three ‘caves’ in central Reigate (east Surrey) on the following five **Saturdays** in 2015 (between 10.00 and 16.00hrs). Former SB chairman Paul Sowan is a member of the team of cave guides.

9 May 13 June 11 July 8 August 12 September

The three rock-cut excavations in the Folkestone Sand below the surviving earthworks and site of Reigate Castle in the park to the north of the High Street are ...

The **Barons’ Cave**, an enigmatic excavation, possibly a wine cellar-cum-sally-port, first mentioned in print in Camden’s *Britannia* in 1586, but possible an original feature of the 11th-century castle of which otherwise only the earthworks survive. This has been a tourist attraction since at least as far back as the seventeenth century. The entrance is in the Castle Grounds park. Lights are provided by the guides. There are numerous steps to negotiate.

The **Tunnel Road East ‘caves’**, are probably former glass-sand mines which have subsequently been used as wine and beer stores, World War I military stores, World War II shelters and an emergency control centre, and air-raid shelters etc. Historical displays feature east Surrey geology and industries, a reconstruction of Surrey’s pioneering horse-drawn railway, World War II shelter life, and the Cold War. The partially reconstructed first-century Roman tile kiln found nearby in Reigate can also be seen.

The **Tunnel Road West ‘caves’**, another glass-sand mine including spectacularly proportioned mine galleries up to four metres wide and five metres high, also once used as a wine and beer cellar and a World War II shelter. Silver sand from both mines was apparently sent to Thames-side glass-houses in London.

Tunnel Road (pedestrianised), opposite Bell Street in the town centre, is England’s oldest surviving road tunnel, made through the castle hill in the early 1820s. **The East and West ‘caves’ tours depart from within the south end of the tunnel.** The ‘caves’ are lit, and ‘cave’ floors are fairly level, with a few steps in places.

Entry charges are made, except that there is no charge for the Barons’ Cave on Heritage Open Day, Saturday 12 September. For details see www.wcms.org.uk .



Sub Brit’s former secretary Malcolm Tadd showing a small party of visitors round the Barons Cave. Photo Nick Catford

Rediscovery of a well near Sandwich, Kent

Water wells tapping groundwater are of two main kinds, vertical and horizontal. The less common horizontal wells rely on the gravitational flow of water from water-logged rock such as chalk or sandstone at a higher altitude. Water is taken from vertical wells by baling, by buckets lowered and raised on ropes, or by pumping.

For wells more than around thirty feet deep, simple lift pumps in which water is forced up by the prevailing air pressure won’t work, and force pumps have to be used. If buckets and ropes are used, in deep wells the combined weight of the bucket and rope can far exceed the weight of water lifted, making for very laborious work.

How far down you have to go to reach water can be anything from a few inches or a foot to some hundreds of feet. And the level varies according to the preceding months’ rainfall. In severe drought, many wells are dry to the bottom.

Obviously, very shallow wells are convenient, being little more than tapped springs. But as the water is at very shallow depth, it is especially at risk of pollution. Deeper wells have an impervious brick or stone lining to minimise the risk.

A lost shallow well has been relocated at Woodnesborough, near Sandwich in east Kent. The location was known from large-scale nineteenth-century maps, and excavation revealed the remains of a small stone-built conduit house, at least partially of medieval date. In its floor was an intact capped well shaft just under three feet square and over



five feet deep. A document dating from 1306 mentions a spring at this location communicating via an underground conduit with a nearby dwelling.

SOURCE: ANON, 2014, Convent Well at Woodnesborough rediscovered. *Newsl. Kent Archaeological Society* 100, 10–11.

Medieval vaulted cellars in Winchelsea, East Sussex

Most ancient towns have at least one known or recorded medieval cellar. Croydon in south London had one (now destroyed) in Surrey Street, and Reigate (east Surrey) still has an accessible one (Scheduled as an Ancient Monument) in West Street. Winchelsea, a small town in East Sussex, has no fewer than 51 known cellars, many of them vaulted, of which 33 are currently accessible. Chester and Southampton are also ‘medieval cellar hot-spots’.



Medieval Cellar under Salutation Cottages, Winchelsea

The Winchelsea cellars have been described in some detail by David and Barbara Martin in book entirely devoted to the archaeology and history of the town. Their account includes a town plan showing the location of the, mostly, 13th- and 14th-century cellars, along with cellars plans and sections, and photographs.

SOURCE: MARTIN, David, and Barbara MARTIN, 2004, *New Winchelsea, Sussex: a medieval port town*. London: Institute of Field Archaeology Monograph 2: xiii + 222pp [ISBN 0-9544456-5-1]

Flint mines in northeastern Belgium

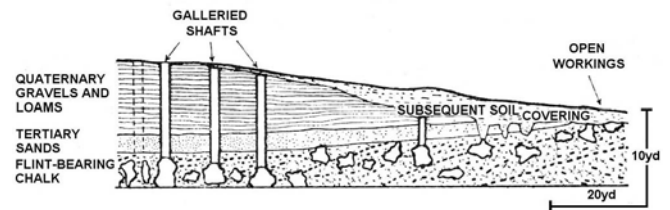
Amongst the best-known flint mining areas in Europe, such as Grimes Graves in Norfolk, must be numbered those at Rijkholt Sint Geertruid in the southernmost Netherlands. They were worked, as at Grimes Graves, from vertical shafts into the local version of the Upper Cretaceous Chalk strata, known here as the Maastricht Limestone. The mines are in the hills flanking the east bank of the river Maas (*Meuse* in French).

The limestone outcrop extends across the international border into Belgium, both the Dutch-speaking and the French-speaking parts of that country. This very distinctive geologically defined area straddling the two countries is known as Mergelland (Marl Land, marl being the local name for the limestone, the word in Dutch not implying a significant clay content as it does in English).

Throughout Mergelland are found underground quarries for building limestone, and flint mines.

Our good friend Ton Breuls’ paper’s title, translated, deals with ‘Flint mines in the valleys of the rivers Maas and Jeker (*Meuse* and *Geer* in French) in the area of Visé’, the first two on the larger river immediately south of the border.

As in East Anglia, flint mining was not restricted to the Prehistoric era. In England it certainly survived into the nineteenth century at Brandon, where gun flints were made for the Army and for export. In the part of Belgium under consideration, flint (rather resembling British chert) has been mined for use in the ceramic industries (as also in Britain). In England, flint is regarded, mineralogically, as a subspecies of chert.



Black English flint is found exclusively as rounded nodules or as sheets filling fissures in the soft white chalk, and has a well-defined cortex or ‘rind’. It is also found, of course, as more or less rounded pebbles along river valleys and on beaches, having been eroded out of chalk cliffs. Chert is generally found in older limestones, and as rather irregular lumps with less well-defined borders. Chemically and mineralogically they are much the same material. In England, chert was mined in recent centuries in various places such as Derbyshire and Yorkshire, Ton’s paper deals with the French-speaking part of Belgian Mergelland, and includes numerous plans of the small flint mines, and photographs of their entrances and interiors.

SOURCE; BREULS, Ton, 2014, *De vuursteenmijnen van het Jekerdal en het Maasdal in Bassenge en Visé. SOK Mededelingen* 61.

NEWS – CONSERVATION AND HERITAGE

Renewed call for a road tunnel under Stonehenge, Wiltshire

The demand for a road which runs past Stonehenge to be removed out of sight into a tunnel has been resurrected by the Director General of the Confederation of British Industry. Stonehenge, internationally recognised as an immensely important prehistoric monument, is far more than two circles of stones. It is an entire landscape, ruined for a century or more by roads running through it.

The A303 road is described as a key arterial route from the southwest to London, but subject to ‘gridlock’ and a seriously negative aspect of one of Britain’s prime tourist sites attracting (and disappointing) thousands from abroad. Plans to upgrade the road were advanced in 2002,



but arguably the only acceptable solution in this sensitive landscape is to bury it in a tunnel. This has, however, been deemed to be too expensive to contemplate as (to avoid disturbing near-surface archaeology) it would have to be bored at depth, very long, and elaborately ventilated. SOURCE: ELLIOTT, Larry, 2014, CBI Chief's one big plea to the Chancellor: give me a road tunnel under Stonehenge. A-road to capital past World Heritage Site is a 'glorified car park', says Cridland. *The Guardian*, 7 November 2014.

Plans for a bunker museum at Carver Barracks in Essex

Plans are in the pipeline for a museum and visitor centre at a Second World War bunker at Carver Barracks near Saffron Walden in Essex. Discussions are under way between soldiers based at the site and Uttlesford District Council. The hope is to restore the old bunker and build a hub which people can visit to learn more about the site's rich history.

RAF Debden was built in 1935–37 and the runways laid in 1940. RAF Debden was one of the seven sector airfields attached to 11 (Fighter) Group at RAF Uxbridge. A protected Sector Operations Centre was built in 1941 consisting of a brick and concrete windowless operations block surrounded by a blast wall and grass-covered earth banks.

In September 1942 the airfield was handed over to the United States Army Air Forces and returned to RAF control on 5 September 1945. After the RAF withdrew from the station in 1974, the site was handed to the British Army and re-established as Carver Barracks in 1975. The barracks were named after Field Marshal Lord Carver, a former Royal Tank Regiment officer.



*The Sector Operations Centre at Carver Barracks in 2003.
Photo Nick Catford*

In the 1980s, Carver Barracks was home to the 1st The Queen's Dragoon Guards, the 13th/18th Royal Hussars and the 9th/12th Royal Lancers – all armoured reconnaissance regiments. It was also home to the Falklands competition, which is held every year for the air training corps. The site is now home to 33 Engineer Regiment (Explosive Ordnance Disposal) and 101 (City of London).

A major problem with flooding in the bunker initially halted talks about creating a historic monument on the

site, but now the issue has been resolved. The plan is to restore the whole bunker, create a visitor centre and possibly have a museum about the bomb disposal unit. SOURCE: *Cambridge News* 24 December 2014, Wikipedia & Subterranea Britannica website.

Imperial War Museum's services threatened by Government cuts

The Imperial War Museum is reportedly facing an annual deficit of £4m as a result of Government expenditure cuts in the public sector. Money-saving proposals are said to include closing the library, cutting education services, and cutting from 60 to 80 jobs. It could be seen as an entirely inappropriate way, during years when the centenary of the country's part in World War I is being commemorated, to remember those who fell. So much, perhaps, for 'We will remember them'.

IWM staff and Prospect trade union have launched an online petition to oppose closure of the internationally important research resource. A leaflet has been distributed seeking support. The petition can be subscribed to at http://bit.ly/savr_IWM

Leadhills Miners' Library, Lanarkshire

Mines at the twin lead-mining settlements at Leadhills (Lanarkshire) and, a mile or two away, Wanlockhead (Dumfriesshire), also historically yielded small amounts of silver and gold and numerous rare mineral specimens displayed in museums nationwide. Both places had libraries started by and operated for the self-improvement of the miners, claimed to be amongst the earliest public libraries in the British Isles.

Your scribe, whose ancestors mined lead if not silver at Wanlockhead (where a small mountain called Sowen Dod overlooks the village), visited both libraries in the late 1950s. That at Leadhills was in the care of the Lanarkshire County Library Service, accommodating a modern lending library alongside historic archives and printed 18th- and 19th-century volumes. This concern has now received funding for building repairs and improvements from the National Lottery Fund. See: <http://leadhillsestate.co.uk/leadhills-miners-library-funding-boost/>

Snibston Discovery Museum to close

Snibston Discovery Museum in Coalville is facing demolition after Leicestershire County Council approved plans to close the facility at a council meeting in January. The Conservative-run council needs to make £120m cuts by 2018 and has said that it cannot afford the museum's £900,000-a-year running costs. It is proposing to sell the existing museum building to developers and create a smaller mining museum in the site's adjoining colliery, which it says will save £580,000 annually. The colliery head frame, which is Grade II listed, will be retained. The council rejected an alternative business plan submitted by the Friends of Snibston group to run the facility through an independent trust.



“I would have loved to have been able to retain Snibston as it is,” said Richard Blunt, the council’s cabinet leader for museums. “We’ve given the Friends ample time and information to develop their proposals over the last year but an independent assessor says that their business plan – which is now on a third version – is not financially viable. I’m concerned that, if we had backed the Friends’ current plans, we would be left with considerable costs and liabilities, which could lead to cuts to other services.”



The Grade II listed head frame at Snibston Colliery

The museum is due to close on 31 July. Plans for the smaller mining museum have also been thrown into doubt after the council admitted that it would be reviewing the proposal again following the general election. The council said that the existing country park and Century Theatre on the same site would be retained under its proposals.

Following the announcement that the museum was to close Sub Brit members Bill and Joan Ridgeway organised a visit for Sub Brit members and friends which took place on Saturday 25 April. The visit included a guided tour of the remaining surface features of the former Snibston Colliery which closed in 1983.

SOURCE: *Museums Journal*, 15 January 2015.

Mining sites on the Historic Environment Record

Historic Environment Records (HERs) are maintained by and on behalf of every English and Welsh local authority, and by some land-holding bodies such as the National Trust. A variant of this system also exists in Scotland. Some degree of protection for archaeologically and historically important sites, including mining sites above and below ground, is afforded if relevant details are filed with the appropriate HER, whether the sites comprise Scheduled Ancient Monuments or Listed Buildings or not.

Once such sites are entered on the HER, their heritage value has to be taken into account when any planning application is considered by the planning authority. Regrettably, however, local authority officers responsible for keeping HERs complete and up-to-date are not well-informed about mine sites and structures, and mines explorers and researchers have not been good

at providing and updating such information. In Surrey, the County Council (SCC) has published a request for details for sites of known (but possibly not yet officially recognised) archaeological importance (CSAI), and for sites considered to have important archaeological potential (AHAP).

Paul Sowan has contacted SCC to alert officers to a number of sites with underground dimensions which in his view meet the specified criteria. These include (1) the London & Brighton Railway’s (LBR) tunnel surveying observatory, a rare survival of this class of structure, built c.1838 on the hill above the first Merstham tunnel. This is probably the earliest surviving structure built by the LBR, and ought to be Scheduled as an Ancient Monument; (2) lime kilns at Betchworth and Brockham limeworks, near Dorking and Reigate (Scheduled at Paul’s suggestion, but archaeological and historical details need to be updated in the light of continuing research); (3) underground quarry tunnel complexes especially at Merstham and Chaldon (assessed by the English Heritage Monuments Protection Programme as eminently appropriate for Scheduling, but not to date Scheduled); (4) silver sand or glass-sand mines at Reigate; (5) known quarry entrance locations at two places in Reigate where no underground access has been reported for over a century; (6) still-accessible quarry entrance locations where mainstream archaeological examination at the surface is expected to yield important findings. It is stressed that traditional surface excavation outside and around mine and quarry entrances is potentially of as much value as underground exploration and surveying.

SOURCE: CLAUGHTON, Peter F., 2015, The protection of historic mining sites, the planning process and the role of the Historic Environment Record. *NAMHO Newsletter* 71 (March 2015), 1 – 2 [With additions by PWS]

SOURCE: SURREY COUNTY COUNCIL, 2014, Surrey Archaeological Designation Review. *Bulletin Surrey Archaeological Society* 446.

Historic steam winding engine relocated, Derbyshire

A disused steam winding engine at the Long Rake calcite mine near Youlgreave has been donated by the owner to the Peak District Mines Historical Society for display at its Temple Mine at Matlock Bath, opposite the Peak District Mining Museum in the Pavilion. It has now been moved to the new location, an underground visitor attraction run by the Museum, and stands outside the mine entrance.

SOURCE: RUSSELL, Andy, 2015, An early Christmas present. *NAMHO Newsletter* 71 (March 2015).

Elms Colliery, Nailsea, North Somerset ‘At Risk’ of collapse

Middle England Pit, or Elms Colliery, at Nailsea, has been owned by North Somerset Council since 1996, but has suffered from neglect and vandalism. Surviving surface structures are at risk of collapse. As this is reportedly the most complete small colliery site in England, there is



some concern for its future. It is on the English Heritage (EH) 'At risk' register. EH and the Council are discussing plans for remediation and safeguarding the site.

Nailsea's early economy relied on coal mining, which began as early as the 16th century. The earliest recorded date for coal mining in Nailsea was 1507 when coal was being transported to light fires at Yatton. By the late 1700s the Golden Valley area of the town had a large number of pits run by a consortium by Peter Cox, Joseph Whitchurch and Isaac White which was formed in 1786 and known as White and Co. John Robert Lucas joined to obtain coal for the nearby Nailsea Glassworks. Remains of the old pits, most of which had closed down by the late 19th century as mining capital migrated to the richer seams of South Wales, are still visible around the town.



The engine house

Three buildings survive from the Elms Colliery. The engine house of the rotative beam engine and associated buildings, including the remains of a horse whim and weighbridge house are Grade II listed. The water tank above the engine house was used to supply water to Elms House after the mine closed.

SOURCE: English Heritage 'At Risk' Register see: <http://risk.historicengland.org.uk/register.aspx?id=49309&rt=0&pn=1&st=a&ctype=all&crit=elms+colliery> & Wikipedia

Brandy Bottom Colliery chimney repairs, Gloucestershire

As a sound working rule, coal mine shafts and adits are considered 'off limits' for underground exploration, in view of the likelihood of bad air (asphyxiating and/or explosive). But in view of the crucial importance of coal mining in the British, and indeed worldwide, 'Industrial

Revolution', a key development in global history, it is culturally important to conserve what few standing monuments remain at surface. One such is a handsome red-brick chimney in the South Gloucestershire Coalfield.

The Brandy Bottom colliery buildings at Pucklechurch have stood derelict since 1936, but were Scheduled as a statutory Ancient Monument in 2001. Since 2008 the Avon Industrial Buildings Trust has worked on restoration at the site. In February 2015 the Trust was advised that English Heritage has approved a grant for repairs to the top of the chimney. Further information is at <http://aiibt.org/brandy-bottom.html>.

SOURCE: ANON, 2015, Middle England Pit, Nailsea, North Somerset. *NAMHO Newsletter 71* (March 2015).

Conservation work at Snailbeach lead and barytes mine, Shropshire

Surface buildings at the atmospheric Snailbeach lead and barytes mine in Shropshire are being repaired and conserved, including the Lords Hill engine house and a boiler house.

Underground tours of the mine are of two categories. The easy option is a walk into the hill along a level mine passage, near the end of which visitors can peer down a deep vertical 'stope' or worked-out ore vein. The more adventurous visit to the deeper parts of the mine calls for negotiating vertical drops, and requires appropriate caving gear and expertise. Members of the Shropshire Caving and Mining Club are on hand at advertised times to allow access, and to guide visitors on either category of visit.

SOURCE: SHROPSHIRE CAVING AND MINING CLUB, 2015, Conservation work at Snailbeach Mine. *NAMHO Newsletter 71* (March 2015).

Funding received for copper mines buildings at Coniston, Cumbria

£16,000 has been received from the Heritage Lottery Fund towards conservation work at the mines at Coniston in the Lake District, with the possibility of £400,000 to follow. The copper mines, amongst the largest in Britain, were worked for some 400 years before they closed last century. The surface buildings and structures are in poor condition, and the pump-priming funding will allow the preparation of a scheme for the required work.

Partners in the project are Lake District National Park Authority, Ruskin Museum at John Ruskin's home at Coniston, Cumbria Amenity Trust Mining History Society and local landowners. For further information a press release is at <http://www.lakedistrict.gov.uk/aboutus/news-pages/big-copper-potential-for-coniston>.

It seems unlikely, however, that the Coniston project will rival the World Heritage Site at the Falun copper-mining site in Sweden, which boasts an impressive opencast, a splendid guided underground tour, and an array of preserved mine buildings including a mining museum.

SOURCE: KEYES, Lisa, 2015, HLF bid for Coniston copper mines. *NAMHO Newsletter 71* (March 2015).



King Edward Mine, Cornwall, wins HLF award

Members attending the SB Study Weekend in west Cornwall (September 2010) will doubtless remember the preserved King Edward mine near Camborne, and welcome the news that this enterprising concern has been awarded £1.1m from the Heritage Lottery Fund to continue its work. See: <http://kingedwardmine.co.uk/what-s-happening-at-kem/> .

Colliery headgear preserved and relocated, Prestatyn, North Wales

Despite the name, the Point of Ayr Colliery raised coal for over a century near Prestatyn, North Wales, before closing in 1996. The preserved top section of the headgear has now been relocated to a site on the coast road at Ffynnongroyw, Flintshire, as a memorial of the last deep mine worked in North Wales. See: <http://www.bbc.co.uk/news/uk-wales-north-east-wales-30335489> .

SOURCE: ANON, 2015, Wales: Point of Ayr, Colliery. *NAMHO Newsletter* 71 (March 2015).

Conservation of Scott's Pit engine house, West Glamorgan

Swansea Council plan conservation work on the 1817 engine house at Scott's Pit, a Listed Building and Scheduled Ancient Monument. It was last used in 1930. See: <http://www.bbc.co.uk/news/uk-wales-south-west-wales-30853806> .

SOURCE: LINGS, Alastair, 2015, Scott's Pit, Birchgrove, West Glamorgan. *NAMHO Newsletter* 71 (March 2015).

NEWS – HEALTH & SAFETY

Serious accident at Clapham South tube station, 12 March 2015

The Rail Accident Investigation Branch is investigating an accident in which a passenger fell between a train and the platform, after being dragged for a short distance by a train departing from Clapham South station on the London Underground system.

The accident occurred on the northbound Northern Line platform at around 08:00 hrs on Thursday 12 March 2015. The train had stopped normally in the platform and passengers had alighted and boarded. A member of staff on the platform signalled to the driver to start the door close procedure. Before the doors fully closed, one set was obstructed and the doors reopened. A passenger who had just boarded, and found that the available standing space was uncomfortable, decided to step back off the train, onto the platform, in order to catch the following train. As the doors reclosed, the edge of this passenger's coat became trapped between the doors.

The driver, who was unaware of the situation, started to drive the train into the tunnel and the passenger was dragged along the platform by her coat. While checking the platform camera view displayed in his cab, the driver saw passengers stepping aside and a person moving with the train, and applied the train brakes. However, before the train came to a stop, the passenger fell to the ground,

off the platform edge and into the gap between the 4th and 5th carriages, having become separated from her coat. The train stopped after travelling about 60 metres. The passenger suffered serious injuries to her arm and head, and was taken to hospital; she is now recovering. SOURCE: RAIB Current investigations register.

NEWS – MILITARY AND DEFENCE

World War II bunker at Eltham Palace

A hitherto little-known wartime bunker at Eltham Palace, an English Heritage property in southeast London, opened to the public on 1 April 2015. The main house features an impressive medieval hall to which is attached an 'art deco' 1930s luxury house, formerly the home of textile heir Stephen Courtauld. It was Stephen and Virginia's domestic air-raid shelter. It seems that the Courtaulds' wealth also brought paranoia, as the planning document notes that it "appears that the family, together with their friends, spent lots of time here during the early years of the war". The bunker was a well-appointed and comfortable space and included a bar, larder, sound system, adjoining billiard room, and gas-proof doors. However, intensive incendiary raids (100 fire-raising bombs fell on the estate) persuaded the Courtaulds to relocate to Scotland in 1944, when the occupancy of the premises passed to the Army School of Education. The restoration has been based on the 1939 inventory for the house. Admission is £10.20.



The restored bunker fitted out with camp beds and conveniently situated near the wine cellar

SOURCE: EDMONDS, Lizzie, 2014, Eltham to open unseen wartime bunker after £1m restoration. *Evening Standard*, 15 October, 2014;

KENNEDY, Maeve, 2014, Eltham's Tudor-deco party-palace reveals a bunker bar, lost paintings and all that jazz. *The Guardian*, 26 December 2014 and *Ian Visits* website.

Nazi weapons factory found in Austria

A secret underground weapons factory, built by the Nazis to test new advanced weaponry, has been uncovered in Austria. The gigantic industrial complex is near the town of Sankt Georgen an der Gusen, close to the underground Bergkristall factory where the Messerschmitt Me 262,



the first operational jet-powered fighter, was invented. The discovery of what is believed to be the biggest secret weapons production facility of the Third Reich came after Andreas Sulzer, an Austrian documentary maker, noticed a reference to the bunkers in the diary of Austrian physicist who was recruited by the Nazis. Sulzer, alongside a team of historians, began to investigate the idea of the bunkers, receiving funding from several German broadcasters to document his discoveries. Sulzer acquired aerial photographs from RAF planes that showed outlines of the complex's concrete structure. Prior to their downfall, the Nazis went to great lengths to conceal the weapons facility, covering the entrances with thick layers of earth and slabs of granite. The vast underground network of tunnels was built by inmates at the nearby Mauthausen concentration camp. It is believed that an estimated 320,000 inmates died building the labyrinth of concrete tunnels and shafts.



The Bergkristall factory for the Messerschmitt Me 262

It is believed to be the location of a secret weapons programme, led by SS General Hans Kammler. Kammler is thought to have lived on the site during the war. Rumours continue to surround his death, with some suggesting he was given a new identity by the US government in exchange for details on Nazi weapons research.

The deadly V-2 rocket which struck at London during the final months of the World War II was tested at the complex. It is also thought that scientists experimented with the use of radioactive material and chemical gas.

The new excavations have had a setback, after local authorities ordered them to be halted until Sulzer obtains a proper permit for the research of historical sites.

SOURCE: *International Business Times*, 28 December 2014.

Soho air-raid shelter could be turned into a restaurant

A WWII air-raid shelter in the heart of London's West End could be transformed into a glamorous subterranean restaurant after being put on the market for £175,000. The 3,200 sq ft brick and concrete shell where hundreds of Londoners sought refuge from the ferocity of the German blitz lies directly under the gardens of Soho Square just off Oxford Street.

Westminster Council is offering a long lease on the shelter, which has already attracted interest from at least three restaurant groups and gym and music venue operators. The letting agents GVA believe the restaurant market in central London is so hot at the moment that anything new and interesting is going to be well received.



The emergency exit in Soho Square

The entrance to the shelter, which also includes an electricity sub-station, is on the western side of the Square and there is an emergency fire escape exit through the Grade II listed mock-Tudor gardeners' cottage at its centre. The shelter was one of dozens hastily built across central London after the outbreak of war in 1939. Leslie Hardcastle, president of the Soho Society, said he recalls spending the night in the shelter several times during the war. He said, "It was lined with about 12 inches of brick and had concrete as a roof. It could take about 150 to 200 people initially although that became less when they put tiers of bunks in. The only facility was a toilet and it could get quite smelly with all the people down there."

Westminster has come under increasing pressure to make more money from its collection of unusual properties by the squeeze on local authority funding. In another example, underground toilets in Fitzrovia were turned into a cafe in 2013.

SOURCE: *London Evening Standard*, 20 January 2015.

WWII Radar station on the market for £2.5 million

The operations block (Happidrome) of the former Dirlerton radar station in East Lothian has been converted into a five-bedroom mansion called Lysander House and has now been put on the market for £2.5 million.

Dirlerton was built in 1943 and was the Ground Control Intercept radar for the Edinburgh area. The station had various radar types including a type 8, mobile GCI and a type 21 which was a development of the GCI comprising type 13 (height finder) and 14 (accurate detection, giving range and bearing radars operating in conjunction. The type 21 thus provided three-dimensional information, range and bearing and also height. A type 7, which was a final GCI version consisting of a large fixed aerial with equipment in an underground well below.

The Happidrome was the hub of the complex which analysed signals received by various nearby transmitters.



Staff in the operations room were tasked with identifying friend and foe signals sent by incoming aircraft. They forwarded the data to the RAF station at Drem, three miles south of the village. After the war, it was used for training until 1954.



The GCI Operations Block (Happidrome) at Dirleton

East Lothian Council records show the current owners applied for planning permission in 2000. Lysander House has a wine store, oak floors with underfloor heating, and a very large decked roof terrace. Estate agents Strutt and Parker are marketing the property and their brochure describes the building as occupying a wonderful, rural location to the north of Dirleton, between the village and Yellowcraig beach. The price includes a second property, Driftwood Lodge, which has been transformed from the standby generator building into a four-bedroom home.

The site was visited by members of Subterranea Britannica circa 2003. The flooded 'well' for the detached Type 7 radar can still be seen on farmland nearby.

Brochure: <http://struttandparker.reapitcloud.com/stprps/pdf.php?p=EDN130459&t=S>

SOURCE: *Canmore and Scottish Express*, 14 February 2015.

World War II basement air-raid shelter now a 'theme' bar, London

A Forties-theme underground bar has been created in a former basement air-raid shelter in Soho. The venue, presented to represent a tube station in use as a wartime shelter, is in Kingly Court off Carnaby Street, previously used as a disco club. Older members may recall that there used to be a bar halfway along the westbound District and Circle lines platform at Sloane Square underground station (a station *not* used as a shelter, of course, being open to the sky).

SOURCE: KITSON, Rod, 2015, Underground scene: bar opens in bunker. *London Evening Standard*, 26 February 2015.

New plans for RAF Aird Uig ROTOR radar station, Hebrides

Gallan Head Community Trust on the Isle of Lewis is seeking tenders for the provision of a feasibility study and technical advice and assistance for income generation projects on Gallan Head, which was formerly RAF Aird Uig. They want to use the local renewable resource of

wind and solar energy to create an income or lower energy needs within the community. The local residents/crofters have expressed a desire to investigate the opportunities and viability of a community buyout of the former MoD site.



The surviving ROTOR period buildings at RAF Aird Uig.

Photo Martin Briscoe

There is a growing interest in the wider benefits of community land ownership. It is envisaged that an amicable purchase could be negotiated with the current owners. The estate extends to approximately 80 acres on three sites; it is owned by the MoD, but currently is vacant and awaiting disposal.

SOURCE: *Community Energy Scotland*, November 2014.

NEWS – MINING AND QUARRYING

Historic photographs of British mines surface buildings and railways

The quarterly magazine *Archive*, published by Black Dwarf Lightmoor Publications Ltd at Witney (www.lightmoor.co.uk) is devoted to British industrial and transport history, and noted for its numerous superbly reproduced photographs.

Mining scenes are featured in most issues. Issue 82 (June 2014) includes illustrated articles on collieries in Durham and Northumberland, and ironstone mines near Egremont in Cumberland. The ground level and oblique aerial photographs depict mining headframes, surface buildings and plant, rail links and rolling stock.

Shaft-sinking for a mine in Kazakhstan

The South African firm Shaft Sinkers, having suffered financially as a result of a five months strike in the platinum mines in that country, has signed a £37m contract with Kazchrome to sink a new mine shaft at the Skipovaya project in Kazakhstan. Presumably this is a mine for chromium ore.

SOURCE: MILNER, Maxton, 2014, Relief for Shaft Sinkers after £37m Kazakh drilling contract. *City AM*, 8 August 2014.

Continued mining at Hatfield Colliery, Yorkshire

Hatfield deep colliery, near Doncaster, is continuing in production, thanks to a £4m loan from the National Union of Mineworkers, alongside an £8m loan from the UK Government. The money is to fund the development of a new coal seam. The output from Hatfield is currently



of the order of a million tonnes a year, reserves being stated to be 'huge'. The quality of the coal is reported to be excellent, of much higher quality than that imported from Colombia, Russia, or the USA.



SOURCE: ANON, 2015, Government cash for Yorkshire's Hatfield colliery. *Down to Earth* 90. See also: <http://www.worldcoal.com/coal/08012015/Hatfield-coal-mine-receives-government-loan-1728/>.

Proposed gold mining at Gortin, County Tyrone, Ireland

A gold-mining project in County Tyrone proposes extracting 2.9 million ounces (90 tonnes) of gold over a period of 18 years at Gortin. Underground mining is proposed to extract 1,700 tonnes of ore per day, most of which of course after crushing and metal extraction has to be disposed of as waste rock. An inclined ramp with truck haulage is preferred to a vertical shaft on account of the geometry and shallow depth of the ore body. A shaft may be found necessary to work ore from lower levels in due course. See: <http://www.dalradian.co/news-and-events/news-releases/default.aspx>.

SOURCE: LINGS, Alastair, 2015, Ireland: Curraghinalt Gold Project, Co. Tyrone. *NAMHO Newsletter* 71 (March 2015).

Exploration in Frongoch lead and zinc mine, Cardiganshire

Roy Fellows has written a detailed and lengthy report on his recent explorations in Frongoch mine, worked mostly for lead and to a small degree for zinc. Levels and shafts have been followed, and backfilled areas dug through, allowing comparisons to be made with a mine plan dating from 1878. Artefacts have been found *in situ*, but water ingress, flooding and unstable ground have hindered progress.

SOURCE: FELLOWS, Roy, 2015, Recent exploration at Frongoch. *NAMHO Newsletter* 71 (March 2015).

Exploration continues in the copper mines at Parys Mountain, Anglesey

Members of the Parys Underground Group have reported continued exploration of levels and shafts in the abandoned copper mines in Anglesey. More is now accessible since Subterranea Britannica last visited some years ago, as the highly acidic floodwater in the lower passages has now been drained away.

Exploration of a 40-metre shaft to the east of the far end of the 45 fathoms drainage level revealed an upwards sloping passage blocked by backfill, estimated to be around 20 metres below the east end of the 'great opencast' at the top of the mountain. A 20-metre shaft following a geological fault is currently being explored upwards from the 30 fathoms level, in an area where no mining is shown on the 1856 abandonment plan.

SOURCE: BURROWS, Olly, 2015, Parys Underground Group. *NAMHO Newsletter* 71 (March 2015).

NAMHO Conferences 2015 and 2016: Nenthead (Cumbria) and Republic of Ireland

NAMHO, the National Association of Mining History Organisations, has its 2015 conference at Nenthead, near Alston in Cumbria, 22 – 25 May 2015. The small and rather isolated settlement of Nenthead grew up on account of the several lead mines in this part of Alston Moor; where there are still accessible mine workings and extensive surviving related surface structures. The March 2015 *NAMHO Newsletter* reported that booked attendees to date (via www.namho.org/conference) number 92, with apparently space for more.

Accommodation is mainly in scattered bed & breakfast accommodation (which those attending should find and book for themselves) or camping. Paper booking forms may be had from Joyce Jackson, Tel: 01642 564100.

The 2016 Conference is to be based in Dublin, hosted by the Mining Heritage Trust of Ireland, with accommodation probably in student lodgings near the airport. No date has yet been advertised, but the programme is likely to include visits to working mines and to mining sites in County Wicklow, as well as lectures.

NEWS – MISCELLANEOUS

Mystery shaft opens up in lawn near Farnham, Surrey

The occupiers of a house at Lower Bourne, around 3 km south of Farnham, Surrey, were surprised when in October 2014 an approximately circular unlined shaft with a diameter of about 1.7 metres appeared in their lawn. At the visible bottom, about seven metres down, there appeared to be a low tunnel leading eastwards. Whether the material now visible at the bottom is identical with that still in place in the walls, or possibly a later shaft fill of a contrasting nature, is not stated.

The residents and their neighbours are understandably somewhat apprehensive: a shaft in the lawn is all very well, but a subsidence under a house is another matter! The location at SU 8454 4379 is on the Folkestone Sand outcrop. Small sand mines (now blocked and/or fallen in) are known to have been worked in the same Lower Greensand beds at Puttenham about seven kilometres to the east.

SOURCE: GRAHAM, David, 2014, Mystery shaft. *Bull. Surrey Archaeological Soc.* 448.



Premature burial suspected, Greece

Those near to death, and their nearest and dearest, had two great dreads in the early years of the nineteenth century as the grave beckoned. One was premature burial, and the other the 'resurrection men'.

Relatives visiting the grave of a family member in the northern Greek town of Peraia were startled to hear, under an adjoining plot, 'banging and muffled shouts'. Cemetery workers were summoned and hastened to bring the recently interred coffin back to daylight. Sadly, the lady inside was certified dead (it seems a second time) by doctors by the time they arrived. It is thought she may have been in a coma when first certified dead, but had revived after burial.

The horror of premature burial in the UK, around two centuries ago, led to the introduction of all manner of devices whereby a person finding himself 'six feet under' could summon help. Bell pulls and speaking tubes were often installed linking the coffin with the ground surface. How often premature burial has actually been reported isn't clear. Another precaution was to defer the funeral and burial until the deceased was visibly beginning to putrefy. The other horror was of granny, freshly dead, being dug up again and sold to surgeons to practise on. At the time, it is believed, the only cadavers legally available to the medical profession were hanged or beheaded criminals, the number of which were presumably insufficient to meet demand. Elaborately locked graves and mausolea (mortsafes) were invented, and watchmen employed to spend the days and nights following the funeral keeping a watch for the 'resurrection men' (corpse thieves). The Anatomy Act 1832 was introduced to discourage the trade in dead bodies. In modern times, of course, many people donate their bodies for the benefit of scientific and medical research and education.

SOURCE: SMITH, Helena, 2014, Woman 'died after being buried alive'. *The Guardian*, 27 September 2014.

Wormhole Cave on the Wirral may be permanently sealed

Historians are calling for a mysterious network of caves in New Brighton on the Wirral to be protected and kept open for the public.

Until recently, the Wormhole Cave, which could be entered via a manhole and a ladder from the garden of a house in Wellington Road, was opened each year for charity, but there are now fears the entrance is going to be sealed up by the owner as the cave has become increasingly popular with local explorers entering without asking permission.

The cave starts at a small man-made archway in the cliff face where the sea used to come up to until about eighty years ago. In the 1930s a land reclamation scheme which created a new promenade left the entrance a few hundred metres inland. The arch is visible from the promenade, being located close to a crazy-golf course.

The first section of the tunnel has been backfilled up to the current access manhole. The tunnel is mostly natural cave with some brick lining and sections of arched brick roof. From the manhole, it consists of a narrow tunnel on a north-south axis which opens out into a main cavern containing a well, and a bricked-up tunnel on the east wall. Several dates are carved on the walls, including one as early as 1619.



The backfilled tunnel leading to the old seafront entrance

The tunnel is said to be linked with others in a cavern underneath the Palace Amusement Arcade in New Brighton. The cave is said to have been used as a smugglers cave. Boats would moor up at the entrance and illegal goods could then easily be taken into the cave and moved up to the house that was conveniently built on top of the main underground chamber.

SOURCE: *Liverpool Echo*, 6 February 2015.

Basement extensions put 'on hold', London

There are evidently large numbers of people (around 129 in the Royal Borough of Kensington & Chelsea alone) ready to spend eye-wateringly large sums of money on massive basement extensions below their homes.

There is currently a proposed ban on such works as the legality of them has been questioned. Kensington & Chelsea has deferred considering further planning applications for enlarging basements, with anything up to three storeys below ground, until a ruling on the legality of banning basement extensions above a certain size has been received. The Borough seeks to ban sub-surface developments of more than one storey, or underlying more than half the area of the garden. The UK Government's Planning Inspectorate is expected to issue a ruling early in 2015.

One resident has suffered the noise and disruption attending seven basement extensions to neighbouring properties, with a fifth application now 'on hold'. There is obviously a lot of money to be made digging holes and kitting them out with basement cinemas, swimming pools, wine cellars, and whatever else takes the millionaires' fancy.

SOURCE: BAR-HILLEL, Mira, 2014, 120 mega-basement plans put on hold until ban ruling. *The Evening Standard*, 4 November 2014.



Scottish Cave Rescue team deployed in Edinburgh

The three-quarters of a mile Scotland Street railway tunnel runs from Edinburgh Waverley station northwards towards Leith, and was used as an air-raid shelter during World War II; it also housed an emergency control centre for the London & North Eastern Railway. It is usually kept locked, but some time in 2014 persons unknown cut off the padlocks, and it became known that young people had held a 'rave' at the site. Before resealing the entrance the authorities wanted to be sure nobody was still inside, so called out three Grampian Speleological Group members of the Scottish Cave Rescue Organisation. A very quick and technically unchallenging search established the tunnel was empty and, perhaps surprisingly, no litter had been left.



Looking south along Scotland Street tunnel in 2006. The building in the foreground is a toilet block with the LNER emergency control centre located in buildings beyond.

Photo Nick Catford

The line from Leith terminated at the south portal of the tunnel, on the north side of Waverley Station. The sealed tunnel portal is visible from the northernmost platform of the modern station. The walled-off south portal overlooks a children's playground.

SOURCE: JEFFREYS, Alan L., 2014, SCRO call-out: Scotland Street. *Grampian Speleological Group*, 5th Series, 1(2).

The skeletons that were left behind, Paris

As Paris was expanding beyond its early city limits in the eighteenth century, out-of-town burial grounds were cleared for new roads and buildings, the disinterred bones being removed to the extensive underground quarries where they have been 'resting in peace' for a couple of hundred years ago. A part of the resulting huge ossuary has long been a popular tourist attraction known as the 'Catacombs', visited by Sub Brit more than once. Your scribe, as a schoolboy in the 1950s, was one of the thousands who have walked between the stacked piles of skeletal remains.

Management of the Monoprix store on the Boulevard Sebastopol plan a basement extension, and preliminary work has revealed mass graves below the building.

Evidently bodies buried in at least one of the city's former burial grounds were not relocated to the quarry tunnels. At least 200 human skeletons have so far come to light. Possibly there may be more, the site perhaps being not quite the last resting place of the victims of a sudden catastrophe or outbreak of disease.



Work on the basement extension and two floors of subsurface storage space has now to accommodate archaeological research, and historical study of the site of a former hospital which was demolished in the nineteenth century. There are at least eight mass graves, seven of them containing from five to twenty skeletons buried up to five deep within a 100 square metre area. The eighth mass grave has to date yielded 150 burials, with possibly more below them. The corpses were of men, women and children, whereas a 'normal' cemetery usually accommodates predominantly elderly persons. All had been buried very neatly, head to toe in straight, parallel rows, rather than just thrown in, presumably to make best use of space.

All had to be removed within two weeks, to allow Monoprix to complete its new basement. Bones will be carbon-dated and subject to DNA examination and checked for clues to the date and causes of death of so many people in evidently a very short space of time.

SOURCE: WILLSHIRE, Kim, 2015, Ground floor: women's clothing. Basement: mass graves of men, women and children. *The Guardian*, 3 March 2015.

Are your digital documents and photographs safe?

The Vice-President of Google, one Vint Cerf, has suggested that digitally stored data may in time become unreadable and lost. 'Bit rot' could result in a 'lost century' of recent history. He identified a need for 'digital vellum' that would store outdated software, operating systems, and data in such a way as to be readable in centuries to come, 'no matter how old they are'. Preserving software needed to read data is apparently a greater problem than the data itself. Cerf has advised that if you have 'photos you really care about, print them out'!

Your scribe, who still uses chemical film and stores prints, is relieved to be doing the right thing, according to the experts at Google! He was reading a book printed two hundred years ago the other day: it is still in



perfect condition! And of course we all know about the Egyptians' papyrus!

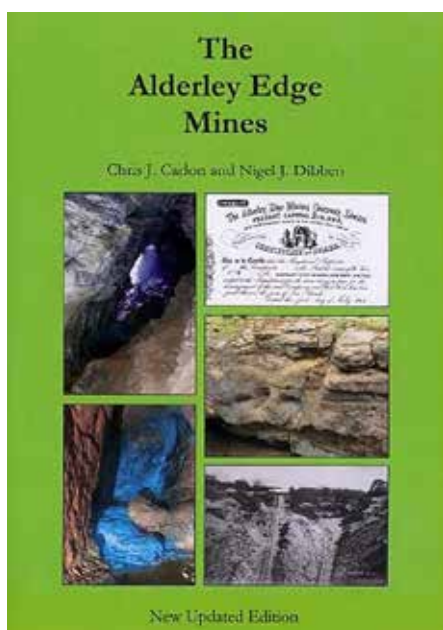
SOURCE: SAMPLE, Ian, 2015, Digital is decaying. The future may have to be print. *The Guardian*, 14 February 2015.

NEWS – PUBLICATIONS

Alderley Edge mines, Cheshire

DETAILS: CARLON, Chris. J., and Nigel J. DIBBEN, 2012, *The Alderley Edge mines*. 184pp [978-1-78280-015-6] [£12.00 + p/p]

Alderley Edge is a wooded sandstone ridge in Cheshire, around 12 miles south of Manchester. The Edge, owned by the National Trust, has evidently been mined for copper at various times from the Bronze Age to the 1920s, with small quantities of cobalt and lead ore in the modern era. The area was visited by Sub Brit in September 2011, prior to the Manchester Study Weekend.



The ore is an unusual one. Instead of sulphide vein minerals, most of the copper occurs as copper carbonate and the like within the fine-grained material between the sand grains and pebbles making up the rock. The several mines and artefacts found within them are described in some detail, and the relevant geology and mineralogy are explained. Copper was extracted from the crushed rock by leaching with acid, followed by precipitation by a chemical reaction with scrap iron.

This splendidly informative and produced book is a radically updated revision of one by Chris Carlon first published in 1979. Access to the mines is now controlled by the Derbyshire Caving Club, who lead guided visits underground both for pre-booked groups and, at advertised times, members of the public. The book contains location maps, mine plans, geological sections, and surface and subterranean photographs, with considerable use of colour. The archaeology and history of the working of, principally, copper ores is fully detailed. After mining ceased in 1926 attempts were made to permanently seal all the entrances. However,

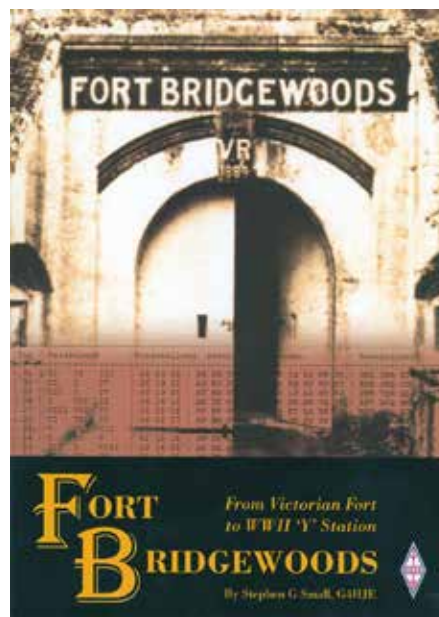
ill-equipped persons frequently broke in, and there were several fatal accidents. The present arrangements with secure doors and management by DCC is very much more satisfactory.

This volume is one of the best of its kind, and excellent value for money at £12 + p/p. Details from Derbyshire Caving Club www.DerbysCC.org.uk or email Secretary@DerbysCC.org.uk or Alderley@DerbysCC.org.uk.

Fort Bridgewoods

DETAILS: SMALL, Stephen G., 2015, *Fort Bridgewoods – From Victorian Fort to WWII 'Y' Station*: Radio Society of Great Britain: 136pp [ISBN 9781-9101-9309-9]

The site for Fort Bridgewoods was acquired by the War Office in about 1860 to form part of a ring of forts protecting the Royal Dockyard at Chatham. It was envisaged that the line would stretch from the River Medway to the Thames but a shortage of money meant only five of the original large works plus two small experimental earthen redoubts were built. Work, using convict labour, started 30 years later in 1890, but by that time France, the enemy it was supposed to repulse, was an ally; the new enemy was Imperial Germany.



In the late 1920s Fort Bridgewoods became the War Office principal Y-station. Y-stations were British Signals Intelligence collection sites initially established during World War I and later used during World War II. These sites were operated by a range of agencies including the Army, Navy and RAF plus the Foreign Office (MI6 and MI5), General Post Office and the Marconi Company. Y-stations were generally of two types, Interception and Direction Finding. These sites collected radio traffic which was then either analysed locally or, if encrypted, passed for processing initially to Admiralty Room 40 in London and during World War II to the Government Code and Cypher School established at Bletchley Park in Buckinghamshire. The work done at Fort Bridgewoods was pivotal in the vital early 'breaks' of the German Enigma traffic.



Post WWII, Fort Bridgewoods was to take on a new role. With the development of the nuclear bomb, a protected Anti-Aircraft Operations Room (AAOR) was built on top of the fort. Shortly after completion, Anti Aircraft Command was disbanded and the site was used for Civil Defence preparation and training. In 1960 the protected headquarters became the regional HQ for London (south) and remained in use until the early 1970s. In 1975 the site was sold to a property developer who quickly demolished the fort and bunker. The site remained empty for a number of years and is now a Parcelforce depot.

Author Stephen G Small tells the story of Fort Bridgewoods from inception to demolition. As the book is published by the Radio Society of Great Britain the author goes into great detail about the general history of radio interception and signals intelligence. The book is profusely illustrated with 186 pictures and plans in its 136 pages. My only criticism is that most of the pictures are small.

This book is available from the RSGB who have offered a 10% discount for Sub Brit members. To take advantage of this discount visit

www.rsgbshop.org/acatalog/Sub.html#a1468

Stone quarrying in Wales

DETAILS: THOMAS, Ian A., 2014, *Quarrying industry in Wales – a history*. Wirksworth: National Stone Centre: 224pp [ISBN 978-1-87182738-5]

This impressively presented volume is an introduction to and overview of the bulk minerals industry in Wales, from the earliest records to the present day. Slate is excluded, and building stones treated only marginally. Coal and ironstone, both of which have been mined in Wales, are not considered. Whilst most of the extraction sites described are opencasts, some of the minerals, such as limestone and silica rock, have been mined underground in Wales.

In an introductory chapter it is stated that (apart from 923 slate quarries) there have been at least 10,029 quarries past and present for, variously, limestone (1,774), dolostone (52), sandstone (6,305), igneous and metamorphic rocks (573), gravel and sand (1,254), silica sand (5) and silica rock (66). The book is profusely illustrated, with parallel texts in English and Welsh. The author was appointed Director of the National Stone Centre at Wirksworth from 1988 until his retirement in 2012.

NEWS – TUNNELLING

Crossrail tunnelling nearing completion, London

The last two tunnel boring machines, *Elizabeth* and *Victoria*, were reported in December 2014 to be nearing the ends of their tasks in the eastern tunnels of Crossrail. By Spring 2015, it was expected, the TBMs which started from Limmo (by the Thames) and halted temporarily while the Whitechapel station box was completed, will be completed. The machines have now been moved forward

through the station box and have headed westwards to Liverpool Street and Farringdon, at which point all Crossrail main tunnelling will have been completed.

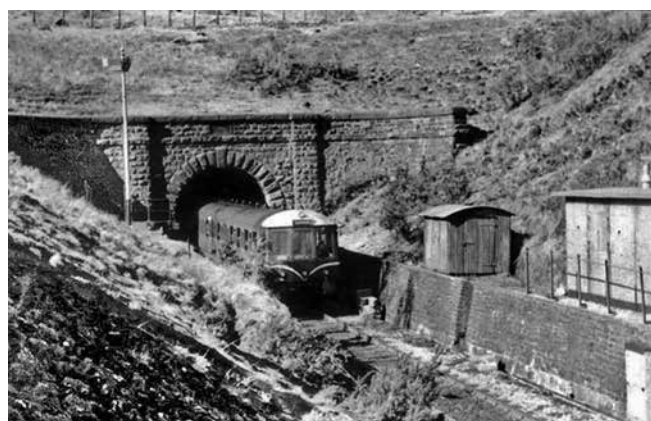
SOURCE: HARVEY, Dan, 2014, Tunnelling nearing completion. *Modern Railways*, 72(796) (January 2015).

Plans to reopen the Rhondda & Swansea Bay Railway Tunnel

Plans to reopen Wales' longest tunnel have taken a giant step forward after it was announced that the tunnel would be inspected by the Highways Agency.

The Rhondda Tunnel Society wants to reopen the 3,443 yards Rhondda and Swansea Bay Railway Tunnel, which runs from Blaencwm in the Rhondda to Blaengwynfi in the Afan Valley, as a tourist attraction.

The group received the breakthrough news when they were contacted by the Highways Agency Historic Railways Estate, who said they would inspect the tunnel in late March. The agency has contracted construction and engineering company Hammond ECS of Aberdare to undertake the inspection alongside the Mines Rescue Service. The tunnel has not been inspected internally for many years.



Rhondda and Swansea Bay Tunnel a few years before closure

The tunnel opened in 1890 connecting the coalfields of the Rhondda with Swansea Bay and was closed in 1968 as part of the Beeching cutbacks that decimated the railway network in the 1960s. The inspection of the tunnel is the latest in a series of positive signs that give the Rhondda Tunnel Society hope that their ambitious project could come to fruition.

The next step to reopen the tunnel for cyclists and walkers will then be the commissioning of a feasibility study. The plans which have received wide local support will not only bring two neighbouring valleys together but also increase the number of visitors to the area.

SOURCE: *Wales Online*, 10 March 2015.

Revamp for the Tyne Pedestrian Tunnel

A £7.1m revamp of the Tyne pedestrian and cycle tunnel has been delayed for a third time after the contractors went into administration. The tunnel, which connects Howdon and Jarrow, closed in May 2013. It was expected to be shut for a year, but reopening was set back after high



levels of asbestos were discovered. Now GB Building Solutions has gone into administration with the loss of 350 jobs, leaving the refurbishment at another temporary standstill.



The Tyneside Tunnel in 2009.

Cyclists to the left and pedestrians to the right

The project has been delayed following a number of issues and is now expected to be completed between the end of 2015 and the start of 2016. The Grade II listed structure, which opened in 1951, is used for about 20,000 journeys each month. One of the features of the refurbishment will be the replacement of two of the original wooden-step escalators with inclined lifts. A free shuttle bus is in operation during the closure.

SOURCE: *BBC News – Tyne & Wear.*

Turkey to build three-level tunnel to connect Asia with Europe

The Turkish government has announced plans to build a giant, three-level tunnel underwater that connects Istanbul on the Asian and European sides of the Bosphorus. The tunnel, measuring 6.5 kilometres long, would sit 110 metres below the sea level. The project was announced by Prime Minister Ahmet Davutoglu in late February, describing the infrastructure as “a harbinger of the new Turkey”.



The tunnel will feature both a highway for cars and a railway. One highway lane will be at the top of the tunnel, the rail line will occupy the middle layer, and the other lane of the highway will be at the bottom. The project is expected to cost about £2.3 billion which will

be financed entirely by private investors. However it is difficult to secure foreign financing for the project, and the government is struggling to find enough domestic private financing. The upcoming elections in Turkey play a key role in the development of the project and it's possible that the tunnel will never become a reality but, despite financing issues, work and planning is going ahead.

SOURCE: *Business Insider*, 27 February 2015.

New ventilation shaft installed in Law Tunnel, Dundee

Engineers have drilled into Dundee's Law Tunnel after concerns over its safety. A new ventilation shaft is being installed at the site in a bid to keep potentially dangerous gases, like carbon dioxide, at low levels.

The Historic Railway Estate, which is part of the Highways Agency, is responsible for its maintenance. Workers enter the tunnel, which closed nearly 30 years ago, once a year to inspect it. The HRE has commissioned three bore holes to be drilled near the tunnel, with one eventually forming a vent that will help keep the tunnel clear of potentially harmful gases.



The northern end of Law Tunnel was excavated in 1981 for a survey prior to the adjacent housing being built.

Photo Elliott Simpson

The track that ran through the tunnel opened in 1831, and was believed to have been the first passenger train service in Scotland. It was a feature of the city landscape for 150 years before the two main entrances were eventually closed off in the 1980s. A recent campaign led on social media has called for the tunnel to be reopened as a tourist attraction.

SOURCE: *Dundee Evening Telegraph*, 13 February 2015.

Seaton Sluice Harbour tunnel could be opened as a tourist attraction

Sir John Hussey Delaval's Royal Northumberland Bottle works at Seaton Sluice, a short distance from Seaton Delaval Hall in Northumberland, produced 1,470,000 bottles in 1777. It was the biggest such enterprise in the country. Most were exported via Seaton Sluice harbour to London, where Sir John had his own bottle warehouse.

In 1761 £10,000 was invested in improving the harbour by carving a channel through the rocky headland. The Cut, as it was known, was 900ft long, 30ft broad and 52ft deep.

Exactly 250 years ago, Captain Curry made history when his ship *Warkworth*, laden with 270 tons of coal, was the first to sail from The Cut with a full cargo. The harbour was a hive of industry, exporting the local products of coal, salt and bottles. There was a small shipyard and a copperas works. Crated bottles were loaded on to one-masted sloops, using tunnels which ran from the bottle works. The tunnels were also used to deliver raw materials to the works.

The harbour was also home to a copperas industry in which iron pyrites or fool's gold, found in the coal measures, was processed to produce iron sulphate, used in glass making, dyes, ink and markers.



Today, Seaton Sluice is a quiet village and the harbour is a marina for small boats and a destination for people out for a stroll. But now the Northumberland and Newcastle Society is floating the idea of how more can be made of the village's remarkable industrial past and how its links with the National Trust's Seaton Delaval Hall can be strengthened.

Access to the extensive network tunnels is still possible and they could be opened up in a similar way as the Victoria Tunnel in Newcastle which has become a popular visitor attraction. Like the Victoria Tunnel, the Seaton Sluice network was used as air-raid shelters during the Second World War.

SOURCE: *The Journal*, 30 December 2014.

First cyclist transit of the Channel Tunnel

Tour de France champion Chris Froome has become the first person to cycle through the Channel Tunnel, taking about 55 minutes to ride through the service tunnel



(between the two running tunnels) under-sea to Calais, reaching speeds of up to 65 kph (40 mph).

The ride is not a simple downgrade followed by a long haul back up the other side. The tunnel profile is a 'flattened W' to allow for two drainage sumps around one-third and two-thirds of the way across. And further uphill and downhill sections result from the service tunnel being routed over or under the running tunnels at the crossover caverns: so it is not quite such a monotonous ride as might be expected.

SOURCE: *Evening Standard*, 7 July 2014.

Railway tunnel near Daventry could be converted into a wind tunnel

In plans drawn up by Brackley-based firm Aero Research Partners (ARP), the disused 3km Catesby railway tunnel near Daventry would be transformed into a wind tunnel to help in the testing of motor vehicles, including F1 cars. The provisional plans could see cars being driven down the tunnel at high speed in order to monitor aerodynamic performance. The company has been working on the project for a number of years and has selected Catesby as it is the only stretch of tunnel in the UK that is long enough for it to work. With a tunnel of this length there is a consistent environment where a range of motor vehicles can be fully tested.

It is particularly useful as there are a number of motor sport teams within the area who would benefit from a facility such as this. The tunnel would be used as opposed to alternative testing facilities which include wind being sucked or blown over a static car, or even a model of a static car on an artificial rolling road. The Catesby Tunnel would not only be more accurate than existing facilities, but also far more energy-efficient than a conventional wind tunnel which uses vast amounts of electricity.

The Catesby Tunnel was opened in 1897 and operated until 1966 when the Great Central, like many British rail lines in the same period, was closed and abandoned. Since then the tunnel, which measures just under 3km, has been left vacant, though one rejected proposal could have seen the HS2 rail project routed through the tunnel. The developers have confirmed they will be keeping people in the local area fully up to date with the plans and hope to announce more details in the near future.





The Laurel Hill Tunnel in Pennsylvania

ARP has completed a pre-planning process where they have been talking to Daventry District Council and has been encouraged by the response they have received. They now want to inform local people of the plans and hope to have a public meeting in Charwelton in the near future.

The idea was first proposed in a light-hearted opinion piece in the March 1995 edition of *Racecar Engineering*, but that article went on to inspire the Chip Ganassi NASCAR team to build one for real using an abandoned highway tunnel in Pennsylvania. The Laurel Hill Tunnel was a huge success and has been used for Le Mans Prototypes, Indycars and Stockcars.

SOURCE: *Daventry Express*, 15 September 2014.

New rail tunnel proposed to link new potash mine to Teesside

York Potash intend to sink a new mine for potash (potassium chloride) near Whitby. To avoid environmental degradation in the North York Moors National Park, the firm proposes to link the new mine to Teesside by rail running in a tunnel.

SOURCE: YORK POTASH, 2014, Potash plan promises more Whitby trains. *Modern Railways* 71(795).

World's oldest railway tunnel awarded protected status

Fritchley Tunnel was built as part of the Butterley Gangroad, a horse-operated railway linking the Cromford Canal with quarries at Crich, and has been scheduled by English Heritage as an ancient monument. Crawshaw Woods Bridge, near Leeds, one of the earliest cast-iron bridges still in situ over a working railway, has also been given protected status.

Fritchley, which was sealed up in the 1980s, was excavated by archaeologists in 2013. It was engineered by Benjamin Outram, and was modernised in the 1840s to accommodate a narrow-gauge railway. The tunnel remained in use until the railway closed in 1933.

The tunnel is located at the junction of Chapel Street with Bobbinmill Hill and Front Street near to Riverside Cottage, in the village of Fritchley. It runs under Chapel Street in a north–south direction for 22.58 metres, with a height of 3.05 metres. The tunnel is constructed from blocks of sandstone. A bend and joint in the stonework is located 15 metres from the northern end, which is believed to mark the end of the original (northern) section, dating from 1793.

The roof is arched, with a circular cross section, and is supported on vertical sides. Part of the northeast wall has been repaired or strengthened using brick. The tunnel walls have gaps, believed to represent holes left by timbers used in building the arch. The north and south entrances have a semi-circular arch; the voussoirs are each constructed from one course of stone blocks. The northern entrance has a stone wall above it that forms a parapet beside Chapel Street.

Both ends of the tunnel have been blocked; the northern end with soil, and the southern end with a modern red-brick structure on top of an older stone structure. One surviving sleeper has been discovered. Near to the sleeper lies a soil path showing wear consistent with use by horses as a towpath.

Benjamin Outram greatly influenced the development of railways in Derbyshire and across England. He was one of the first to recognise the potential of railways to provide a nationwide transport system which would



Locomotive 'Fitz' emerging from the south portal of Fritchley tunnel with a train of limestone for the Butterley Company's limekilns at Bullbridge

bind the country together, and the Butterley Gangroad was where he first developed the ideas which were soon adopted across Britain. The Fritchley tunnel has now been recorded officially as the oldest railway tunnel in the world in the Guinness World Book of Records.

SOURCE: *BBC News – Derby*, 19 March 2015 and Wikipedia.



Sector Operations Centre/Gun Operations Room (Black Building')

Kirkwall, Orkney 1944 - 2009

Geoffrey Stell

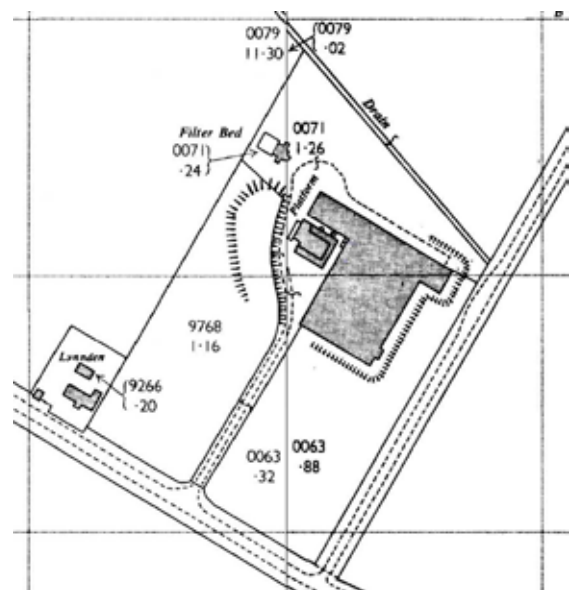


The 'Black Building' in June 2004. The high double doors on the left were the equipment entrance. Photo Nick Catford

Summary

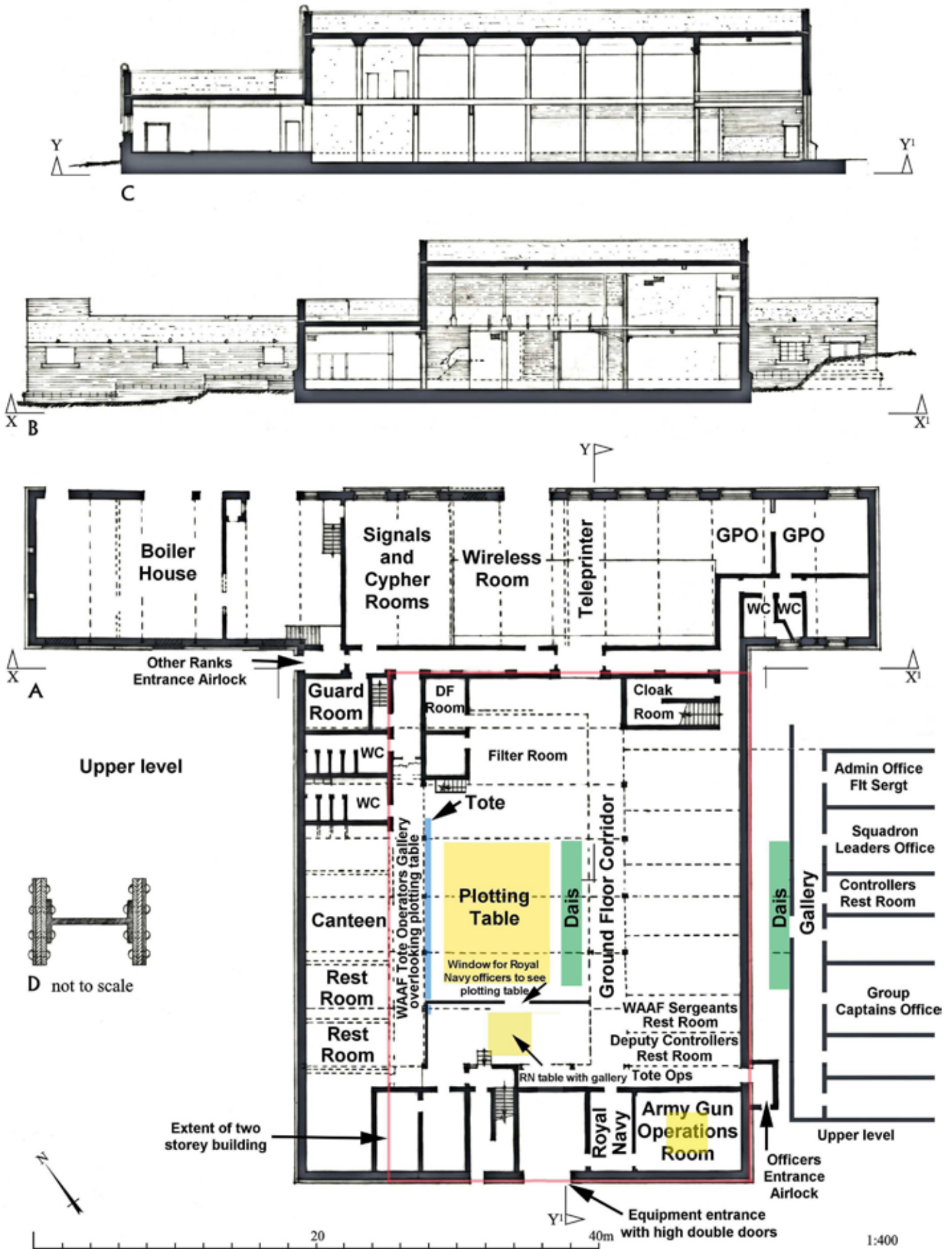
In military use from January 1944 until March 1946, this Combined Operations Block, known familiarly as 'The Black Building', was a large and conspicuous landmark on the southern slopes above Kirkwall. Not overlaid by the functional and structural requirements of the post-war nuclear era, from 1949-50 until the creation of a new telephone exchange in the early 1970s the building continued in civilian use as a repeater station operated by the GPO, which had been one of its many wartime functions. In about 1990 the then derelict building was acquired by a local furniture removal and storage contractor with a view to converting it into a warehouse. This unfortunate scheme was eventually aborted, but only after the wartime interior had been stripped out, openings had been slapped through the walls, and bomb-proof shingle had been removed from the roof.

Notwithstanding this regrettable damage, the building retained much of its original structural character, so that



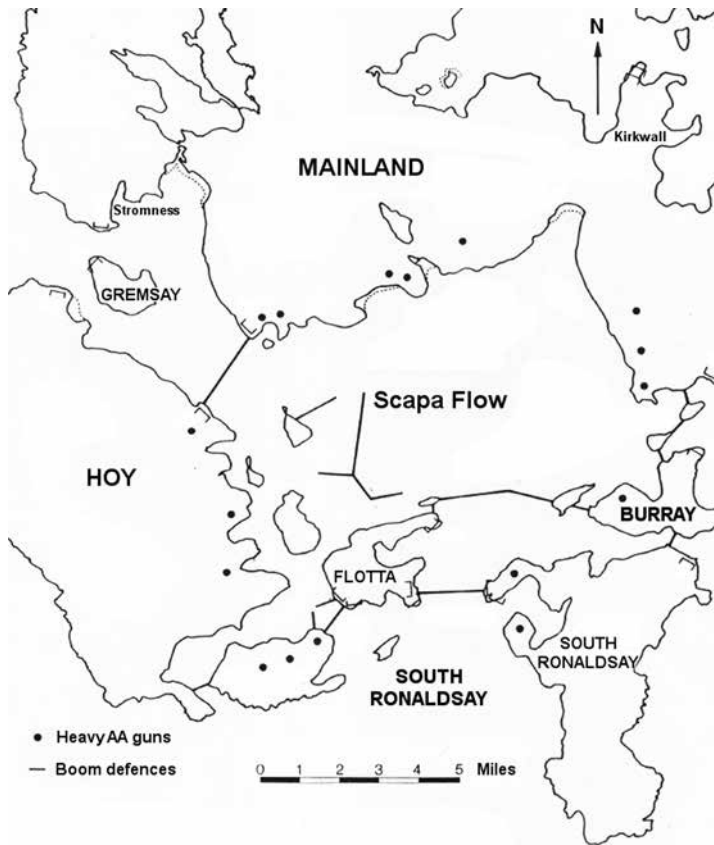
OS 1964 1:2,500 map





This plan was made after a survey by RCAHMS in 1997/8 and depicts the site as it was at that date. The annotations were made from a 50 year old memory applied to the new plan, which means that the titles are correct but the locations not necessarily so. The main problem in interpreting the map is that the building is viewed from above and gives no indication of height differences, i.e. there are 3 storeys with 5 different levels all shown as one. No original plans have been found to date so there is insufficient data to reproduce the building on a floor-by-floor basis. Following entrances and staircases may help to determine levels. Annotated by Nick Catford from notes made by T H Wilkinson, former RAF Deputy Fighter Controller. Crown Copyright: RCAHMS. Licensor www.rcahms.gov.uk, GV 004828





This map shows the locations of the HAA Batteries encircling Scapa Flow, the Fleet Anchorage, which were controlled by the GOR at Kirkwall

when, in 2009, long-dormant proposals to demolish it and turn the site into serviced housing re-surfaced, attempts were made to persuade Orkney Islands Council to give the building a reprieve and to explore its potential as a wartime heritage centre. The case was referred to Historic Scotland, but because of ‘the condition of the building, the lack of surviving interiors, its heavily eroded exterior and denuded context’, they decided not to take forward statutory designation of the building.

Demolition began almost immediately in November 2009, and several years on, the site remained a heap of rubble. However, a development brief by Orkney Islands Council issued in January 2011 retrospectively acknowledged the historical military importance of the building, and a commemorative plaque remains part of the plan for the site.

This image of the Kirkwall Gun Operations Room shows the two plotting tables in June 1944. At the beginning of the war there were only 8 guns available, all on Hoy, these are shown on the table in the foreground. The Lettered grids refer to the large 100 km square that all meet at squares 90-00-99-09, grids Y, Z, D, & E. These grids are the Military or War Office Cassini grid not Ordnance Survey. By 1942 there were some 25 sites surrounding Scapa Flow (see Scapa Defences map), the smaller table in the background shows these later gun sites. This table been saved by a local museum and is currently in store in Lyness.



History and physical character

Under construction for over two years, the combined RAF Fighter Sector Headquarters and Army Gun Operations Room at the head of Inganess Road, Kirkwall, became fully operational on 28 January 1944. An issue of the Group *Radar Bulletin* of that month reported that ‘On the 28th Kirkwall Filter Room was transferred very smoothly, with no “line-hitches” thanks to the G.P.O., from the ex-hangar to the new block. “The Kremlin” is proving very satisfactory. Rumour hath it that guide books and binoculars are a standard issue to all personnel.’

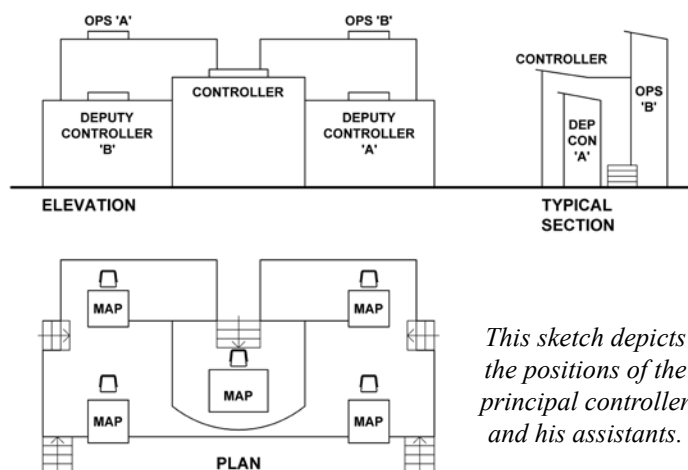
The ‘Kirkwall Kremlin’ had an active military life of just over two years, one of the information boards still visible in 1974 recording the fact that ‘this fighter sector headquarters was closed on Friday 15 March, 1946, after controlling the interception and destruction of 24 hostile aircraft.’ A paper notice found in the building on that occasion listed the main events of the war from September 1939 onwards, finishing with a wryly-worded entry: ‘March 1946 – Orkney liberated’. Located at NGR HY 4603 0969 for optimum radio reception and landline communication, the new windowless operations block was built about half a mile upslope of its predecessor SOR and GOR. From 1940 these had been housed in buildings flanking Bignold Park Road on a site later occupied by a creamery and



The operations room in January 1990 during the partial clearance of the building for reuse as a furniture warehouse. The picture was taken during a school trip by St. Andrews School. This image of the Ops Room clearly shows the Dais area and the foundations of the false floor; the image was taken from where the Filter Room was (see plan). The controller sat at the central curved fronted desk as indicated in the sketch. The naval plotting room was above the two-tone green wall to the right centre of image. Photo Kenny Ritch

the Milk Marketing Board, now all replaced by housing. RAF Bignold Park took up much of the adjacent area on each side of Holm Road, and this camp continued to accommodate personnel serving at the new block. In this same vicinity, Lynnfield Hotel was the RAF's wartime headquarters in Orkney, shared with the Army's 58 AA Brigade, and from 1940 to 1943 Grimsetter Airfield, now Kirkwall Airport, served as a satellite of RAF Skeabrae. Including support staff, the total number employed at the operations block was probably at maximum about 250–300. For plotting alone, we know from eyewitness accounts that the usual shift system obtained, with around 34 persons in each of three daily watches. Many others were employed in signalling and telephone communication, intelligence, meteorology and guard duties. There was also a significant Royal Artillery and Royal Navy presence, making this the single most important place in Orkney where sections of all three armed services were physically together under one roof. As elsewhere, the principal function of the operations block was to receive, process, plot and where necessary translate into action, information on the dispositions of all aircraft movements within the Sector, hostile and friendly, RAF and Fleet Air Arm alike. The core data came from the network of radar stations in the Sector, of which by this date there were many, from ROC sources and often directly from pilots of incoming or outgoing Allied aircraft.

Again, as elsewhere, 'filtering' was the essential process that attempted to make intelligible sense of the plots of aircraft flight-paths that came from the radar stations before it could be accurately mapped and used as a basis for operational action.



This sketch depicts the positions of the principal controller and his assistants.

Drawing based on a sketch of dias by T H Wilkinson, 1998

Central to the function, the Filter Room and the Operations or 'Ops' Room were also central to the building's design and layout, the Ops Room being dominated by a controller's gallery or dais which overlooked a large table map on which aircraft positions were plotted. If a hostile raid was detected and needed to be intercepted, senior RAF personnel in the Ops Room would communicate directly with RAF squadrons based in Wick, Skeabrae or, for a time (1940–43), nearby Grimsetter. Likewise, as required, Royal Navy staff in an adjacent room were fed the information which they duly passed through to the Fleet Air Arm stations at Hatston, Twatt, Grimsetter (as HMS *Robin* (1943–45)), and where appropriate, to vessels at sea.

The Royal Artillery, here under the Orkney and Shetland Defences (OSDef) Command, had their own smaller plotting table in a designated room off the main central

area. Information was likewise fed to them for onward priming of the Army's command and control system across the Scapa Gun Defended Area, the second largest GDA in Scotland, comprising a network of 25 Heavy Anti-Aircraft (HAA) batteries, the core of the justly famed and effective Scapa 'box barrage'. Indeed, the only known view of any part of the interior of this building during wartime is one which shows one of at least two Army plotting tables in use in 1944.



This image shows the remaining, left half of the Tote in 1990; there was a gallery/walkway behind the tote for WAAF's to update details on the tote. Above the left-hand wall, in black, the frame of the Naval Plotting Room window can just be seen. Photo by Kenny Ritch

The photograph long remained unidentified in the IWM collections, but faintly discernible on the table map is the odd jump in the codes of the HAA batteries on Hoy & Walls from H1 to H3 which clearly identifies the map as Orkney. Sadly, after the building had been demolished, one of the Army tables, together with wall-mounted boards from the main Operations Room, turned up in a museum store at Lyness.



Site of filter room (to the right) in, May 1996.

The plotting table was to the right.

Note the demolished stairs on the side of the room.

Crown Copyright: RCAHMS. Licensor www.rcahms.gov.uk, SC 642954

The Black Building

Though latterly standing proud of its immediate surroundings, as first built the Operations Block was surrounded by earthen banks which concealed much of the structure and gave it a semi-subterranean appearance. The effect of a dark and low profile was increased by camouflage netting slung across the site on wire cables and much use of tar, hence its local nickname as the 'Black Building'.

The structural skeleton was an impressively solid and thick framework of concrete and steel double beams, and a deep parapet above the flat roofs was filled with stone chippings for bomb-proofing. Its precincts would almost certainly have been protected by light anti-aircraft and perimeter ground defences but no evidence of them has survived.

Eye-witness memoirs of the interior of the Ops Room testify to its impressive scale and grandeur. In the words of Tom Wilkinson, one of the deputy controllers, it was 'about the size of a small cinema. Its main feature was a table measuring 7 yards by 8 yards. On top of the table was painted, in colour, the grid map of the Kirkwall sector.'

Tom went on to describe how the building 'was air-conditioned and proof against poison gas. This was achieved by all the air being filtered and ducted throughout the structure, and the air pressure within the building being kept slightly higher than the barometric pressure without. It follows, therefore, that the whole building had NO windows; any traces of what appear to be window apertures MUST have been made after the war. The number of entrances was kept to a minimum and each had an airlock.

'The whole functioning of the building depended on electric power supplied by the Grid; therefore it was essential to have a stand-by electricity supply, independent of the commercial one. This was achieved by having diesel-powered generators', whose location, probably adjacent to the boiler house, he could not recall precisely. In 1998, he could remember but was also uncertain about the positions within the building of the GPO repeater station and a room 'carrying a very large number of electricity storage batteries.'



Bomb-proof slabs and several feet of shingle being removed from the roof in 1990. Photo Sandy Windwick





*Roof slabs in store at Hatston in 1994.
Photo Sandy Windwick*

Jeanne Williams (née Oxley), a WAAF plotter, refers also to the large plotting table ‘in the well of the room with the Controller and his assistants on a higher level in a glass cabin. Opposite the Controller was a large “tote” board which gave all readiness information on the RAF squadrons. Also on this level and in glass-fronted offices were the Navy and Ack-Ack liaison officers and their staffs.’

Jeanne had served in the previous SOR and was aware of the great physical contrast between the two establishments. The first Ops Room had been set up in an old aircraft hangar which was said to have come from Stromness, probably from the civilian airfield at Howe Farm. It too had had a large central plotting table, overlooked by the Controller and his assistants on a raised dais facing a large ‘tote’ board, and flanked by desks for the Army and Navy staff and a small table for the D/F plotters. To her ‘the whole appearance was of DIY but very efficient nevertheless’. At the new, purpose-built operations block to which she and her colleagues then moved ‘everything was far more technical and far more spacious but no more efficient’.

This echoes the sharp contrast in the architectural character of successive Operations Rooms remarked upon elsewhere, most notably in the account by Peter Wykeham: ‘... when the Sector Operations Rooms were humming at fever pitch and the whole life of the country depended on them, they were match-boarded structures hurriedly lashed up in odd houses, schools, hotels and even derelict shops. When their great days were past the Works Department proudly unveiled fine constructions specially designed and built for the purpose’.

Kirkwall’s place in Fighter Command organisation

Of the four RAF Fighter Groups that existed at the time of the Battle of Britain in August–September 1940, Group 13, centred upon Kenton Bar, Newcastle upon Tyne, covered the north of England, Northern Ireland and the whole of Scotland. It soon became apparent that geographically this Group was far too unwieldy, and within a year large parts of its territory had been transferred to new Fighter Groups, 9 and 14 centred upon Preston and Inverness with responsibilities for north-

western England and northern Scotland respectively. Later, in September 1941, Northern Ireland was also hived off under a separate 82 Group.

At the centre of the new 14 Group in Inverness the RAF took over Longman Airfield in April 1941, and established their Group HQ in the Drumossie Hotel and at Raigmore. Even then, as Ian Brown has commented, ‘No. 14 Group covered a huge area, extending from the northern approaches to the Shetland Islands in the north to approximately the River Tay in the south, and from the approaches to the Western Isles to the approaches to the east coast of Scotland. This area included around 45 radar stations, many of which were distant from Inverness Filter Room, and in order to avoid the filter room becoming congested, sub-filter rooms were established at Kirkwall, Lerwick, Stornoway, Benbecula and Tiree. Kirkwall and Lerwick Sub-Filter Rooms handled plots from stations in Orkney and Shetland respectively.’



*This message was chalked on the wall shortly before the building was vacated on 15 March 1946.
Photo from Orkney Grammar School Magazine 1974*

In a further reorganisation in 1943, 14 Group was merged with, and absorbed, 13 Group under an Inverness-centred, all-Scotland command and into which the new Kirkwall Combined Operations Block was slotted in January 1944.



Directions to rooms were still visible on the walls in January 1990. Photo Kenny Ritch



The site of the operations room in June 2004. Most of the internal walls in the two-storey section were removed in 1990 when the building was being converted into a furniture warehouse. This view is looking towards the site of the dais. The upper level gallery is seen. Photo Nick Catford

the need for on-the-spot information led to the creation of Group Filter Rooms.

However, as Ian Brown has shown, this practice had already been pioneered at Orkney's first radar station, Netherbutton Chain Home, 3.5 miles south of Kirkwall. Upon its becoming operational in June 1939, it was decided that it 'would not "tell" (pass plots) to Stanmore Filter Room, but would instead report to a local filter room where the information would be of direct use. The plots would then be passed for information purposes to Stanmore.'

At the outbreak of war Netherbutton was thus the only radar station not plotting directly to Stanmore. During its first year its plots were passed to Wick, and then from 25 September 1940 to the Filter Room, attached to the first SOR in Kirkwall, just a few miles away.

Sector operations in and over Orkney had at first been controlled from Wick, where, prior to its becoming a Sector airfield in December 1939, a SOR had been established in a primary school in the town in the summer of 1939. By the following summer Wick had also acquired a satellite airfield at Castletown, but by September–October 1940 its SOR staff and responsibilities were being transferred to Bignold Park, Kirkwall, where they were lodged for the rest of the war, Wick thereafter gradually assuming a greater role in Coastal Command.

Extending geographically from Sutherland to Shetland, the Kirkwall Sector had considerable strategic military importance, embracing as it did Scapa Flow, the principal wartime anchorage of the Home Fleet. Indeed, the shift to Kirkwall can be seen as part of the strengthening and sharper focusing of its defences following the early attacks and setbacks there.

Orkney also found itself in the vanguard of a process of regional decentralisation of radar networks and the routing of filtering paths. From its inception in November 1938 the Filter Room at Fighter Command HQ at Stanmore had become the centre of a national reporting system, receiving plots from radar stations throughout Britain. By 1940, congestion following the rapid expansion of the radar network and

Comparisons

The three SORs first established in Scotland – at Edinburgh Turnhouse, Aberdeen Dyce and Wick – all had close associations with sites that already were or were shortly to become Sector airfields. The only one that preserves significant physical traces is the second phase SOR associated with Edinburgh Turnhouse, located away from the airfield in an abandoned quarry at Barnton and well known to members of Subterranea Britannica.



Demolition of the Black Building is underway in November 2009. Photo Steven Heddle

There, the low, elongated but relatively compact wartime surface building, developed underground in two phases during the Cold War, appears to be of a standard type that has been encountered elsewhere at, for example,

RAF Tain and RAF Ballyhalbert in Northern Ireland. These structures obviously operated in a manner similar to the Kirkwall SOR, but not on the same scale and not incorporating other service operations.

In design and layout, Raigmore, Inverness, conforms to a pattern of Group HQs which, typically, were configured along dispersed lines, made up of three separate component bunkers a few hundred yards apart: an Operations Room, a Filter Room, and a Communications Centre. What survives at Raigmore is a refurbished adaptation of the Filter Room bunker, which evidently bears comparison with surviving Filter Rooms at other Group HQs, such as Kenton Bar, Goosnargh and Watnall. Overall, however, the access corridor arrangement creates a more linear design compared to the composite rectangular layout of the Kirkwall building. Until its demolition in 2009, the Kirkwall Combined Operations Block thus appears to have been a unique survivor in Scotland, possibly even a unique creation to serve the special co-ordinated inter-service air defence needs of Scapa Flow.



Once it was clear the building would not be listed it was quickly demolished. Another view from November 2009.
Photo Steven Heddle

Sub Brit's contribution

For the United Kingdom as a whole, Subterranea Britannica has created admirable survey records of most, probably all, known surviving components of one-time Fighter Sector and Group HQ stations, so this is a welcome opportunity for the author to tap that unrivalled expertise and to ask how many other wartime combined operations blocks are known about, where were/are they, and have they fared any better than Kirkwall's?

Remote interrogation of Sub Brit and other records suggests, provisionally, that there may be close analogies with the so-called 'Happidromes', the relatively late operations blocks associated with Ground-Controlled Intercept (GCI) radar units. As Nick Catford's plans of the Reporting or Operations Room at RAF Sopley, Hampshire, show, they accommodated Army liaison officers through whom information was supplied to the HAA batteries and searchlights in the local GDA.

Similar provision for liaison with anti-aircraft batteries and searchlights was incorporated into the function and design of the subterranean Bankstown Bunker, Sydney, Australia, RAAF No 1 Fighter Sector HQ (later No 101 Fighter Control Unit). Perhaps significantly, like Kirkwall, it was a relative latecomer to the wartime scene, opening in January 1945 and operating until 1947.

Biographical note

Geoffrey Stell is a building historian who specialises in the study of Scottish castles, towers and fortifications. In 1969 he joined the staff of the Royal Commission on the Ancient Historical Monuments of Scotland (RCAHMS) where he was Head of Architecture from 1991 until his retirement in 2004. Since then he has served as a heritage consultant and part-time lecturer at Edinburgh College of Art, University of Edinburgh.

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Memoirs

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Website links

www.subbrit.org.uk/rsg/sites/s/sopley/index1.html

www.subbrit.org.uk/sb-sites/sites/p/patrington/index.shtml

www.ozatwar.com/raaf/1fshq.htm

www.ozatwar.com/raaf/typicalfshq.htm

en.wikipedia.org/wiki/Bankstown_Bun



Addendum

Since this article was prepared it has become apparent that there are discrepancies between what is depicted on the plan and the images, which warrant some comment. Two of the images were taken on a school visit in 1990, the plan was drawn following a survey by RCAHMS in 1997/8 and it was this plan that was annotated for Mr Wilkinson in 1998. The plan depicts the structure remaining at that date.

Since closure by the military in 1947, the building was used by the GPO as a telephone relay station and from that date until 1990 various unrecorded variations and demolitions took place but the Ops room and dais was left mainly intact. After the school visit, the entire two-storey section was gutted, leaving just a portion of the gallery and a couple of integral rooms within a huge space intended for storage. The foundations, stub walls and joists that supported the false ops room floor some 4' – 6" above ground level were all removed leaving just marks and traces of paintwork indicating the original floor level. The original unique structure was built as an RAF Sector Operations Centre (SOC) co-located with an Army Gun Operations Room (GOR), also included was a RAF Sub Filter Room – normally a function of a RAF Group Command, the next higher formation – together with a Royal Naval Plotting Room. Under normal conditions the SOC received its information from the Group Filter Room and this was displayed on the SOC plotting table as well as the GOR (wherever this was) as the GOR was under the operational control of the SOC. Due to the remote location of Scapa, a sub Filter Room was devolved from the No 14 Group HQ at Inverness.

The presence of the RN plotting room adjacent to the GOR raises the question of whether it was for the control of the several Fleet Air Arm (FAA) stations in the Orkneys or for the control of the fleet's considerable AA gunfire when in port.

Two fleet destroyers had the same number and size of guns as an army HAA Battery, meaning that a destroyer flotilla of 8 ships was equal to 4 HAA Batteries. The fleet could have several of these flotillas at any time, not to

mention the larger Cruisers, Carriers and Capital ships whose secondary armament was, larger than HAA guns equated to 2 HAA batteries of 16 each, ie 16 guns.

The army strength of HAA, starting with just 8 guns at the beginning of the war, by 1944 amounted to 2 HAA Brigades with 3 HAA Regiments of 11 HAA Batteries consisting of 79 guns spread over 25 gun-sites encircling Scapa Flow together with 2 Light AA (LAA) Batteries and 2 Searchlight Regiments of 108 searchlights. These, together with the fleets guns comprised the formidable 'Scapa Box Barrage'.

Without an original plan it is difficult to say which rooms had been altered or removed before the school visit but we do know what remained at the time of the RCAHMS survey in 1997/8. It was this plan that Mr Wilkinson used to annotate his memories of where things were 50 years before and associate rooms together with their locations, but a whole suite of rooms had been demolished from the southern end of the building between the ops room and the southern outside wall. Only two walls of the Naval Plotting Room are depicted, one with the observation window. Details of room access and the other two walls are unknown.

In conclusion, the Sector Ops Room, a box within a box, has only the long – dais and tote - walls remaining and defined, both end walls together with whatever rooms were there are gone and this should be borne in mind when viewing the images especially that of the Dais.



St. Andrews school visit in 1990. Photo Kenny Ritch

Subterranea Britannica : Study Weekend Gloucestershire 4-6 September 2015

Our UK Study Weekend will be in Gloucestershire; site visits are being arranged by Sub Brit member Jonathan Maisey. We'll be focusing on Stone Mines, which are likely to include

- Ω Windrush (recent discoveries have doubled its size since the last SB visit in 1997)
- Ω Quarry Hill (discovered in 1971 when a road was being dug)
- Ω Lower Balls Green
- Ω Whittington &/or (possibly) another mine that had been discovered since 1997.

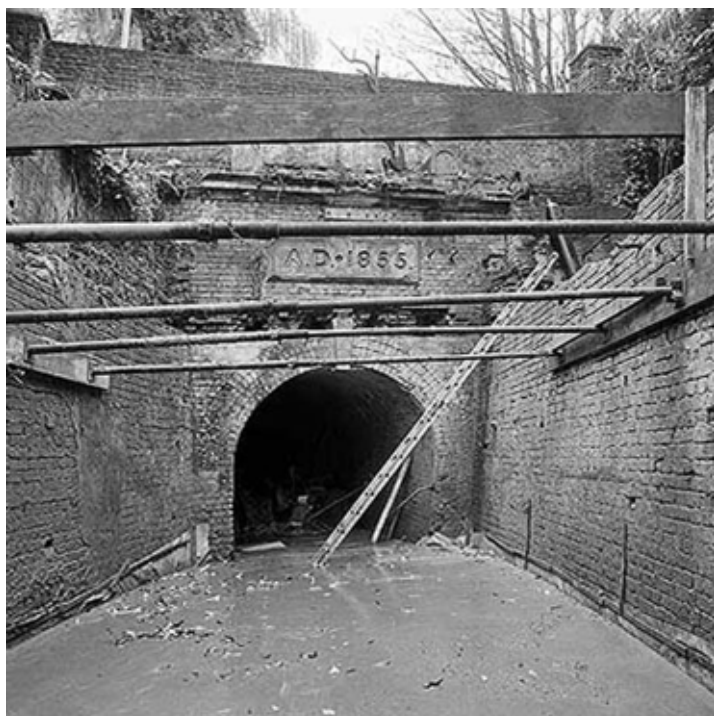
We'll be staying in Cirencester at the Royal Agricultural University. More information will be sent out to all members by email nearer the time. Booking will be on 'mySubBrit', so you must be a member to come along.



Highgate Cemetery

Above and Below

Jason Holdcroft



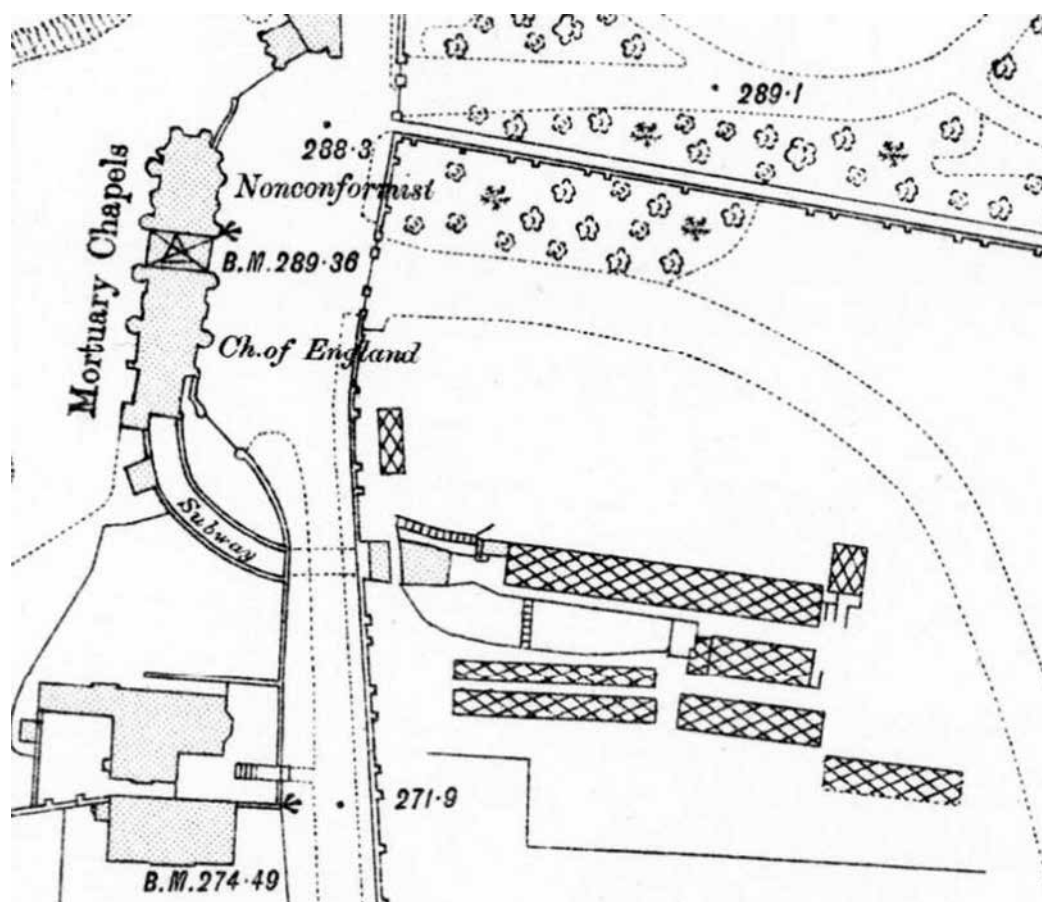
Restoration work is underway on the tunnel approach in the East Cemetery in the 1980s. Photo © Historic England

On 15 February 2015, we took a trip to the Capital for a look at Highgate Cemetery, having whetted our appetites for cities of the dead at the Sub Brit trip to South Norwood Cemetery a few months before. Highgate is one of London's famous 'magnificent seven' cemeteries and is open to the public for a small charge every day of the year except Christmas and Boxing Day.

We began in the newer East Cemetery, which visitors are able to peruse unaccompanied, and took in memorials ranging from the mighty bust of Karl Marx – which still gathers quite a crowd – to the more surprising, such as the late Jeremy Beadle!

The historic West Cemetery, dating from 1839, is only open by pre-arranged tour with a knowledgeable and entertaining guide, and Sub Brit members will be especially interested in the grisly tales of the Terrace Catacombs, and the wonderfully designed Circle of Lebanon, a grandly constructed circle of mausoleums built around an ancient cedar tree.

1895 1:1,056 OS Town Plan shows the tunnel under Swain's Lane linking the west and east cemeteries. The 'subway' shown on the west side of the road is an open brick lined cutting leading from the mortuary chapels to the tunnel. Coffins in the chapel were lowered to tunnel level using a hydraulic coffin lift. The chapels are extant and the first part of the cutting can still be seen but the remainder up to the tunnel portal has been infilled. On the east side of the road the cutting has been filled in and covered with graves. The cemetery workshop stands on the cutting.



Tunnel vision

Of particular subterranean interest, although sadly inaccessible, is the tunnel underneath Swain's Lane connecting the two cemeteries. The reason for this, back in 1854 when the road was not so busy, was that the deceased could not leave consecrated ground and the Lane, having no borders, could not be consecrated. The tunnel, running to the East Cemetery from the Church of England Chapel on the west side, was fully enclosed and could therefore be consecrated, with the coffin arriving there by means of a hydraulic lift for its final journey.



*The surviving part of the tunnel now used for storage.
Photo courtesy of Dr Ian Dungavell/Friends of Highgate Cemetery Trust*

After exchanging emails with Dr Ian Dungavell, Chief Executive of the Trust which runs the Cemetery, I learned a little more about the tunnel, the construction of which was a requirement of the founding Act of



The surviving part of the curving approach cutting is clearly seen in this aerial view of the mortuary chapels.

Parliament should the cemetery be bisected by a road. That came to be in 1854 when the additional area was purchased on the other side of Swain's Lane, and the architects Wehnert and Ashdown were charged with laying it out. The tunnel has unfortunately been mostly filled in, and only 10–15 feet remains, used as storage.

Before going bust, the London Cemetery Company sold off the filled part and both sides have been built on.

The extant tunnel space is alarmed and the Trust is keen to discourage any would-be explorers for safety reasons. Highgate Cemetery is well worth a visit for what there is to see above ground though, and a trip below is perhaps best delayed!

Website: <http://highgatecemetery.org/visit>

Hack Green Open Day Saturday 27th June 2015

This will be the 15th year that Rod Siebert has opened the bunker for Sub Brit members. The early warning siren will be activated & the massive Marconi radar array will be operational all day; the bunker will be disconnected from the national grid & will be running in full "Fallout" operational condition.

The cost is £20 per person which includes entry to the bunker complex all day, presentations and a buffet lunch. We hope to organise an informal evening get together as well

Organised by and proceeds to the Hack Green Bunker.

To book, please find the booking form on the Sub Brit website.

For more information phone: 01270-623353 or email: coldwar@hackgreen.co.uk

Or see the website on: www.hackgreen.co.uk



Project Riese Weekend

Poland – October 2014

Martin Dixon



Main gallery at Rzezka showing partially completed concrete lining. The roughness of the original excavation must have massively increased the volume of concrete needed. The smaller higher level passage would have been used for ventilation and other services. Photo Chris Wilkins

An intriguing invitation was sent to Sub Brit members last year to join a weekend of visits in October 2014 to a group of underground sites in southern Poland known collectively as Project Riese. The sites – eight in all – were constructed in World War II between 1943 and 1945. They are located in the Owl Mountains (Polish Góry Sowie) just a few kilometres from the current border with the Czech Republic.

None of the sites was ever finished and the exact purpose of the complex has never been fully determined. Some say they were to be another set of underground factories similar to Mittelwerk/Nordhausen where V1 and V2 weapons were constructed. Others believe they were destined to be a shelter for high-ranking Nazi officials and a safe repository for plundered treasures. More fancifully there is even talk about the development of anti-

gravity devices that would revolutionise aerial transport and combat. Hopefully by the end of the weekend we would be able to form our own opinions about the exact purpose of the incomplete labyrinth.



Project Riese

In World War II, Germany fully embraced the advantages of moving underground. From the Atlantic Wall to Hitler's Eagles Nest, mother earth and vast quantities of German cement protected many aspects of war including artillery, ammunition, manufacture, and everyone from the armed forces to the general public. The department which masterminded the construction programme was known as Organisation Todt after its original leader, Fritz Todt. Todt died in a plane crash in February 1942 and the organisation was absorbed into the Ministry of Armaments and War Production under Albert Speer.

In September 1943, Albert Speer started talks that initiated Project Riese. Riese in German translates as 'Giant' which gives some indication of the size of the planned construction. The Schlesische Industriegemeinschaft AG (Silesian Industrial Company) was created to conduct construction work. In November of the same year collective camps were established for forced labourers and Prisoners of War, mainly from the Soviet Union and Poland.

A huge network of roads, bridges and narrow-gauge railways was created to connect excavation sites with nearby railway stations. Prisoners worked on this infrastructure and the transportation of materials as well as the actual excavation. The forced labour force was augmented with mining engineers from Germany, Italy and elsewhere but one can be sure that the latter were much better protected from blast and rockfall. The hard gneiss of the bedrock slowed progress compared to (for example) the softer sandstone that we experienced in the Sub Brit trip to the Czech Republic earlier in 2014. Reinforcement of the resulting tunnels was clearly planned but extremely limited in execution as we shall see in the accounts of individual sites.

The prisoners were housed in a number of surface camps, generally very close to the mining operation. In December 1943 a typhus epidemic occurred and as a result, construction slowed down significantly. In April 1944, dissatisfied with the progress of the project, supervision of construction was handed over to the Organisation Todt. They increased the workforce by setting concentration camp inmates to work. A network of camps was established near the tunnels, under the umbrella of the Gross Rosen concentration camp. It is believed around 13,000 prisoners were assigned to the project, of whom almost 9,000 have been identified from documentation.

All of them were Jews, about seventy percent from Hungary, the rest from Poland, Greece, Romania, Czechoslovakia, the Netherlands, Belgium and Germany. Mortality was very high because of disease, malnutrition, exhaustion, dangerous underground works and the treatment of prisoners by German guards. Many exhausted prisoners were sent back to Auschwitz concentration camp. The deportation of 857 prisoners is documented as well as fourteen executions after failed escape attempts.

At the end of 1944 another typhus epidemic occurred amongst prisoners. Because of the advancing Allied front, evacuation of the camps began in February 1945. However in a few places last-ditch (literally) works might have been conducted as late as the end of April. A small number of prisoners were left behind, mostly seriously ill, until the Red Army arrived in the area in May 1945.

It is estimated that 5,000 of the forced labourers and POWs lost their lives during construction. The unfinished and abandoned tunnels and related works are for most their only memorial.

Wroclaw

The weekend was jointly organised by Sub Brit member Chris Wilkins and his Polish friend Raf Marcinkiewicz. Raf is a keen photographer and a member of a Polish group known as the 'Bunkerites' whose passion – like many in Sub Brit – is the exploration of underground fortifications, particularly from the twentieth century. Chris and Raf met up at the annual 'Bunkerites' party in Poland where they agreed to jointly arrange a trip from the UK.

The nearest airport to the mountains is Wroclaw, served from a number of UK airports by Ryanair. Many flew in from Stansted but those who looked carefully at the timetable opted for East Midlands to avoid an arrival into Wroclaw around midnight and a departure from the hotel at 0530 on the last morning. Eventually 18 of us met up at our Wroclaw hotel and had the first of many excellent-value beers. We were staying in the Quality

System Hotel – to the north of the city but conveniently located by a tram terminus. The first lesson we had from Raf was how to pronounce the city we were in. The pronunciation approximates to Vroxwaf; in the time it took most of us to master this, it was just about time to return home!

Saved by the Bell

We met at breakfast and learnt that our transport out to the mountains was 'unavoidably detained'. It seemed a degree of double booking had taken place and so we were stood down for the morning. Most of us took the opportunity to sample Wroclaw's trams which luckily had very efficient ticket machines that included an English option. The city's trams date back to 1877 and there are twenty different lines. Some of the rolling stock dates back to the 1970s but there are also some very modern and comfortable units built by Skoda with a single through carriage and four articulated joints.





The enigmatic henge-like structure at Die Glocke or the 'Fly Trap'. Photo Chris Wilkins

Eventually on our way, we headed south for about three hours, across the southern plains and then up into the Owl Mountains. Chris and Raf had helpfully reordered the sites to fit with our delayed departure and our first stop was at Die Glocke, German for The Bell, and also known in English as The Fly Trap. We approached the site through a derelict industrial setting that was once the Wenceslas Coal Mine and parked on the hillside by the most striking feature – a large concrete structure, around 30 metres in diameter and not unlike a modern Stonehenge.

This, according to some, was connected with the development of a secret German weapon which would have defied gravity. The supposed weapon was originally described by Igor Witowski and popularised by, amongst others, British author Nick Cook. The alleged weapon was bell-shaped and according to Witowski “made out of a hard, heavy metal approximately nine feet wide and 12 to 15 feet high”. Cook describes the device as “containing two counter-rotating cylinders which were filled with a mercury-like substance, violet in colour”. The henge structure was supposed to be used to test or perhaps launch this weapon. Search the web if you’d like to know more but I think that’s enough detail for *Subterranea* ...

Heading Underground

The immediate area operates as a small museum and there was a small collection of (mostly Soviet-era) trucks and vehicles that didn’t occupy us for long. More invitingly, an entrance to a tunnel led off on the uphill side of the area and in we went. The tunnel led to a couple of rooms – almost certainly originally guardrooms and now with some reconstructed displays. The passage was lined with posters of other ‘Terror Weapons’ to give credence to the site’s claim to fame. Then at a cross passage a steeply descending slope led down to what our guide assured us was the original coal mine. Along the side of this were supports for some seriously heavy-duty cables; whatever had been done on the site had certainly consumed some serious power.



The cable tunnel at the Fly Trap that leads to the valley below and its coal mines. Cable trays on the left-hand wall. Photo Mike Scott

Sadly we weren’t allowed to explore further – partially to try and prevent the access at a lower level being discovered and used by metal thieves to strip the site. So we retraced our steps and took a walk through to some extant buildings that may have served as barrack blocks or industrial units. These had been built with an over-burden of soil which was originally grassed over to provide natural camouflage from aerial reconnaissance. The passage of years has resulted in a veritable forest growing atop the structures and this gave an unusual and almost contemporary feel to the site. As a reflection of the original standard of engineering, the roofs were still intact and watertight.



The Sub Brit party awaiting orders at the Fly Trap. Photo Chris Wilkins

Time had caught up with us and as we returned to our transport we mused on what the site’s purpose had really been. From the evidence seen, large amounts of power were expected to be used on the site. A direct connection with an active coal mine suggests the use of coal on site. Natural oil sources were increasingly scarce in wartime Germany, a major factor in the Nazi decision to invade the Soviet Union in 1941. Synthetic fuels were mainly produced from coal and it seems most likely to me that the site was destined to be a major production centre for synthetic fuel. The henge-like structure is thought by some to be the base of a cooling tower and this or similar purpose gets my vote.



Complex Wlodarz

Our second site of the day was one of the underground sites where most progress had been made before abandonment. Before we ventured into the tunnels our guide led us on a surface walk where we could clearly see, despite the encroaching forest, part of the huge network of narrow-gauge railway. The tracks led away from the tunnel entrances on parallel embankments. At the end of each of these could be seen where spoil had been dumped – sometimes separate piles from individual wagons could be made out. It is possible that when one dumping area filled up, the track was moved to a new location, rather than the entire network being active at the same time. We could see a few remaining sleepers – in one case apparently heading towards a yet-undiscovered tunnel entrance.



Narrow-gauge tipping trucks at Wlodarz. The courses of many kilometres of trackbed can be traced but most of the track was plundered as scrap postwar. Photo Mike Scott

Also outside, within what is today a heavily wooded area, we could discern vast stockpiles of bagged cement – totalling in the thousands. The immensity of this scarce resource (imported from Italy) shows both the priority of the project and the anticipated rate of progress. As we were to see, very little of the cement ever made it inside the complex. Approaching the main entrance of the complex in fading light, we were startled by a vociferous guard dog and glad to reach the relative safety of the tunnels.

A museum site since 2004, the complex has four known entrances, leading to three parallel entrance galleries and one offset by around 40 degrees. Fifty metres or so inside each tunnel is a guardroom complex, complete with a machine gun loophole. Whatever the purpose of the tunnels, it was intended to be well-guarded. Most of the complex is still in native rock but the far left-hand tunnel guardroom was largely completed with a concrete lining.



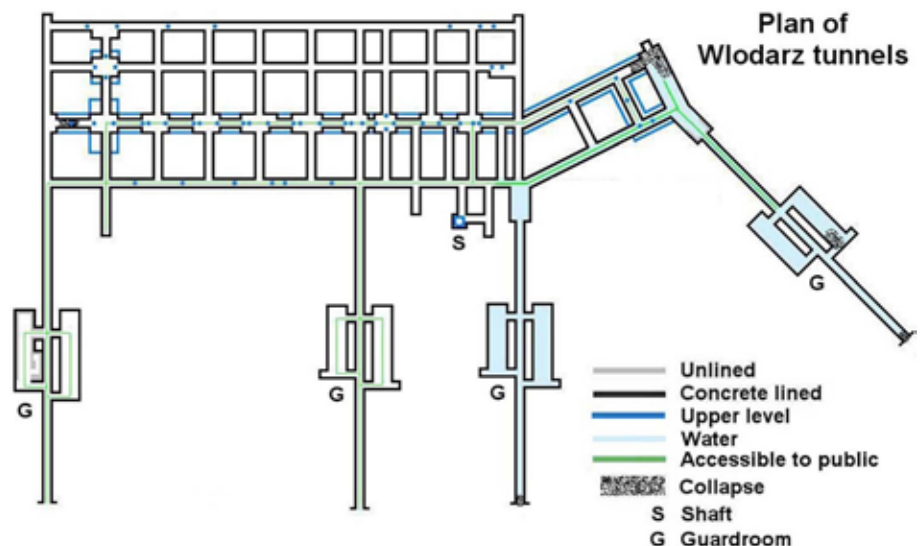
Crudely cut pilot tunnel at Wlodarz. Photo Chris Rayner



At Wlodarz very little of the complex has been concrete-lined. Here, just the entrance to a side chamber has had the treatment. Photo Chris Rayner

Double level tunnels

Around fifty metres beyond these strong points, the complex expands into an orthogonal network of tunnels, with a total length of around three kilometres. In some places a second, higher level of tunnels has been excavated above the entrance level. In a few areas these two levels have been knocked through to produce tunnels or halls up to ten metres high. One theory is that the tunnels would only be combined in this way where the extra space was required for particular factory machinery.





Roughly completed side chamber at Włodarz. The comparatively poor standard of finish implies the huge speed at which the project was being advanced.

Photo Chris Rayner

It is equally possible that the whole system would have been enlarged in due course. Bringing materials and finished product out through narrow tunnels could have been a constraint if the complex had ever become an operational facility, but it is possible that the entrances were being kept small to minimise the risk of detection from the air and to reduce the impact of bomb detonation.



Unlined passage at Włodarz. Photo Chris Rayner



Reconstructed narrow-gauge railway within Włodarz. Photo Chris Rayner

One large shaft to the surface remains; whether this was purely for construction or would have played some part in the final operation is not known. A substantial flow of water entered the tunnels through this shaft. Two of the tunnel entrances are currently blocked by falls and other debris and as (like most mines) the entrance adits slope slightly uphill to aid drainage, around a quarter of the tunnels are now flooded.

The museum has exploited this by offering visitors a boat ride through the flooded sections, self-hauled by ropes attached along the roof-line of the tunnel. Our group boarded two of the boats and whilst exploring more of the complex we were lucky to avoid capsizing ourselves!



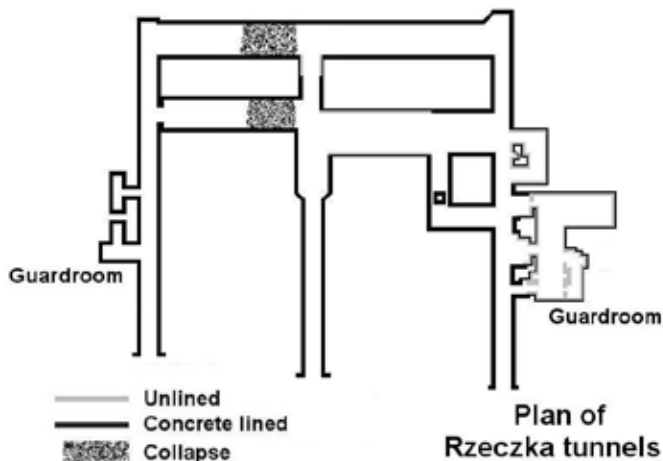
Part of the flooded section at Włodarz which the Sub Brit party had great fun navigating by boat. Photo Mike Scott

And so to bed

Darkness had well fallen by the time we emerged from our time underground and the weather had taken a turn for the worse. We made the short journey to our next hotel, a pleasant family-owned inn called Zajazd Hubert; located in the small village of Walim, it dates from 1801. We were welcomed with a roaring open fire and whilst Steve Underwood was warming himself a plank from the ceiling fell down onto his head [no major injury!]. But as they say, every cloud has a silver lining and we were supplied with free homemade wine all evening as compensation.

Rzeczka

Our first site the following day was only about three kilometres up the valley from Walim. Named after Rzeczka, a settlement just beyond, it was a smaller-scale version of Włodarz with only around 500 m of tunnels being completed. There were three entrances, all originally connected underground but rockfalls mean that the third tunnel has to be separately entered. Normal access is on a tour by a Polish guide – but as he didn't like Raf's English translation interrupting his flow, we were let off the leash and given free rein.



Only the most northerly entrance has a completed guard room and the cross-passages that cut across the rear of the entrance tunnels tower up to 12 metres or so. Unlike Włodarz there was no evidence of upper and lower tunnels which suggested that the large halls had been excavated in one piece.



Machine gun (contemporary but not original) within one of the guardrooms which protected each entrance at Rzeczka. Photo Chris Wilkins

One of these large halls has partial concrete reinforcement and at the northern edge (beyond a rockfall) a modest 'sound and vision' display gives an atmospheric impression of working conditions during construction and names some of the workers known to have died on site.



An impressive display at Rzeczka, in one of the massive cross passages. The scale can be judged by the human mannequins at work on the clear working platform or benches. Photo Chris Rayner

Limited public access has been possible since 1995 and the current museum was established in 2001. As well as a few (rusting) exhibits within the tunnels, there is an excellent set of display panels outside which tell the story of Project Riese and which have many fine contemporary photographs.



A largely complete side chamber at Rzeczka, filled (as often at similar museums) with 'rusty bits' including ventilation plant and rifle barrels. Photo Chris Rayner



A replica V1 at Rzeczka suggesting one possible use had the complex ever been completed. Photo Chris Rayner

Although the exact purpose of the site has never been determined, a replica V2 rocket stands erect at the roadside to try and attract visitors. It looks particularly incongruous, wearing a paint scheme of black and white quadrants as used in test firings at Peenemünde rather than the camouflage of production rockets.



A protected shelter (possibly for a sentry or from a marshalling yard) and a replica V2 rocket at Rzeczka. There is no evidence to connect V2 construction with the site but it presumably attracts the tourists in. Photo Chris Rayner

Grodno Castle

With time to spare before our next site, we had time for a short walk over the scenic dam of Zagórze Śląskie which now forms Lubachowskie Lake. Originally used for hydro-electricity as well as water supply, the area is now home to lots of leisure activities including boating, swimming and walking and, in season, skiing.



*This dramatic aerial shot shows the commanding position of Castle Grondo.
Photo Agnieszka Kaluzny*

Following this we then got even more exercise by ascending up to Castle Grodno, which dates from the thirteenth century. The castle has been through many hands including occupation by the Czechs, Swedes and Germans. It made an ideal spot to eat lunch at a convenient bar and most of us made the ascent to a look-out tower with a glorious 360-degree panoramic view.

Osovka

Suitably refreshed, we set off for the final site of the day – the Osovka Complex. This followed a similar pattern to the other sites, in this case having two entrances to the main complex. There is another short unconnected stretch but we weren't able to locate this entrance. Our guided tour took us into the mountainside and we could quickly see that more of the complex had been concrete-lined than at either Rzeczka or Włodarz. The guardrooms appeared almost complete; we were told that it is one of the few locations where hibernating bats have been found.



*Castle Grondo: the finely carved stone of the door surround contrasts with the ruinous state of adjacent walls.
Photo Agnieszka Kaluzny*



*Castle Grondo: this somewhat irregular wooden spiral staircase leads to the lookout on the highest tower.
Photo Mike Scott*



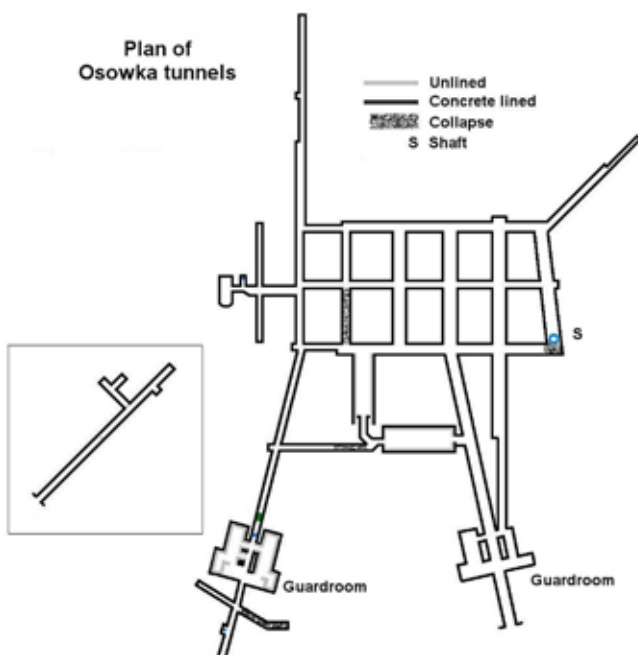
*Gated entrance to one of the entrance tunnels at Osowka.
Photo Chris Rayner*



A passageway at Osowka in a much more completed state than most of the excavations in the area. The walls are lined with posters of WWII weapons. Photo Chris Rayner

Work in Progress

Next, a surprise, as the tunnel rises up steps perhaps fifteen metres. Whatever the purpose of the complex this seems very odd – whether used for manufacturing, storage or personnel protection this would certainly have hampered operations. One of the plans marked this as



a fault but we didn't have time to look properly at the geology before we had to move on. Beyond this level change we entered another grid layout, with some of the tunnels widened to form huge halls. One of these still had the extensive arched shuttering over which concrete had been poured – a dramatic snapshot of 'work in progress'.



The unexpected ramp that links two levels in the Osowka complex. Some believe this was necessary to overcome geological faulting. Photo Chris Wilkins



Impressive original shuttering still in place at Osowka. Beyond can be seen the remains of construction activity to excavate the pilot tunnel to full height. Photo Chris Rayner

Like Włodarz, part of the complex is flooded but we did not have the time to explore this by boat. We did, however see a shaft reaching perhaps fifty metres to the surface with a diameter of around six metres. The tunnels have been used for the filming of a number of science-fiction films and the remains of the set sit gently decaying alongside the more usual rusting wartime artefacts.

Onwards and Upwards

On exiting the underground section the more energetic of the group ascended a long steep hill to explore the top of the complex at our own speed. This was one of the highlights of the visit. First we were able to see the top of the shaft recently viewed underground. Around this were a number of areas that looked like the bases of wartime huts – perhaps for construction workers.

These in turn led to a section of underground tunnel which appeared to have been designed as a conduit for cables or piping but was high enough for pedestrians. This tunnel



Incomplete excavations at Osowka show the crude finish to the unlined tunnels. The rock-bolted roof support is recent – installed in order to get permission for visitors to pass through. Photo Chris Wilkins

was unfinished and alongside it we once again saw huge stockpiles of bags of cement, showing that the works must have been abandoned at great speed. Of course cement needs aggregates and sand and we were surprised to see large silos – large enough for many tons – alongside the stacks of cement. Perhaps the shaft was being used to feed in supplies of concrete?

Opposite a trackway from these silos was a vast building known locally either as the *Officers' Mess* or the *Casino* building. It is around 50 metres by 13 metres with walls around 0.5 metres thick, and is almost complete with access through large window openings easily achieved. The speculation is that it served as some sort of headquarters building. Inside, the building was bare but interestingly it still retained extensive wood-wool boards to the ceiling. This was an early example of their use as permanent shuttering – I can't recall seeing this aspect at other German-built World War II sites.



The massive building known as the Officers' Mess or Casino on top of the hill above the tunnels at Osowka. It seems likely to have been built for habitation rather than equipment. The roof was designed to be planted with vegetation to hinder aerial detection. Photo Chris Rayner

Around 250 metres away was the second large below-ground structure. Conventionally known as the *Power Station*, this is built only to ground level and measures

around 30 metres square. The structure contains a number of manholes, hoppers and conduits which were explored by the party using original ladder staples. Extensive reinforcing bars showed that an above-ground structure was planned but the exact purpose of the building is unknown but some sort of power-generation seems as likely as anything.



The complex at Osowka nicknamed the Power Station or the Gymnasium. It certainly seems to have been designed for heavy plant. A number of underground chambers can be accessed. Photo Chris Rayner

Exploration over, we returned to our hotel and found a large village wedding was underway. It's unusual for Sub Brit not to be the noisiest group but we were certainly eclipsed that night. We retired to the bar where the photos on the wall included many of the German tunnels over the last seventy years.

Mine Host (pun intended) then introduced us to the local drinking game which involved generous glasses of his home-distilled vodka, although the sensible ones amongst us stuck to less fiery shop-bought supplies!

Książ Castle

Our final site in the mountains was Książ Castle – half an hour's drive en-route back to Wrocław. It is located just outside Wałbrzych (Waldenburg in German) and is the third largest in Poland. The original castle was built in the thirteenth century and protected the trade routes



The magnificent frontage of Książ Castle; the majority of the subterranean complex lies beneath the castle itself and the large forecourt. Photo Mike Scott

from Silesia to Bohemia. It changed hands many times and underwent two major reconstructions.

The first of these was in the early eighteenth century and many of the rooms and facades are from this era in a magnificent baroque style. Between 1909 and 1923 a second reconstruction added rooms and a frontage that look as if they have been plucked from one of the châteaux in the Loire valley.

Two levels underground

However it was the underground bits that interested us and this phase unsurprisingly dates from World War II. The castle was seized by the Germans in 1941 and adapted for use as one of several potential headquarters for Hitler. This included construction of two subterranean levels, at 15 m and 50 m below ground level. The lower level is used by Polish geologists and houses sensitive seismographic instruments. Sadly this meant it was off-limits to us but tunnels at this level total 950 m in length and are around 5 metres square with access from the castle via two lift shafts.

We were, however, able to explore both the original castle cellars and the higher level of the wartime tunnels. The former included a display on the underground complex including, intriguingly, a cement bag labelled ‘Portland’ but sourced from Italy. We were also able to view the tops of two lift shafts to the lower levels.

We then entered the 15-metre-deep tunnels from a garden entrance and passed the usual guardroom with machine gun loophole. The tunnel led around eighty metres; we were able to see the bottom of one of the lift shafts earlier viewed from above. At the end of the tunnel was a D-shaped shaft with the half-built remains of a ‘spiral’ staircase within. A short ‘sound and light’ display in the tunnels simulated their use during an air raid.

Hochbunker

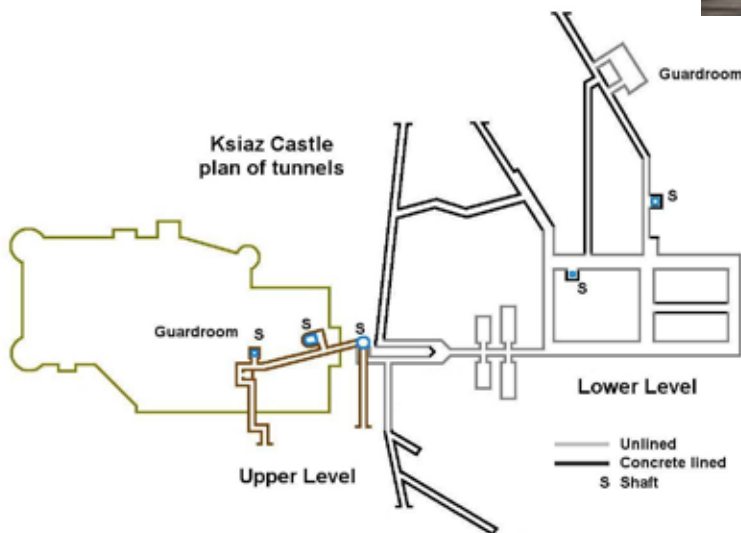
Arriving back in Wroclaw mid-afternoon, most of us ventured to the suburb of Strzegomska to view an interesting reuse of a German *Hochbunker* – (literally, high bunker). Several such bunkers were built between



The unfinished ‘D’-shaped stairwell that leads to the tunnels beneath Castle Ksiaz. Photo Mike Scott



Built between 1942 and 1943, this 25 metre high ‘Hochbunker’ in Wroclaw is now home to the Museum of Contemporary Art. Photo Chris Rayner



1942 and 1943 to protect the civilian residents of the (then) Breslau. The massive cylindrical structure has six storeys and is 25 metres high. Known in the war as *Festunglazaret II*, the structure later stood empty for many years. Then in the 21st century the building was transformed into the Wroclaw Museum of Contemporary Art (Muzeum Współczesne Wrocław or MWW).

Opened in September 2011, the gallery has a large steam locomotive outside mounted vertically, as if emerging from an underground lair (Wroclaw

used to be a major centre for the manufacture of steam engines). Our taxi driver from the airport even told us it was a railway museum.



The roof of the Hochbunker now houses a bar with splendid views which the group took advantage of. Swords into Ploughshares indeed. Photo Chris Rayner

The truth was disappointing to some of us and the exhibits are distinctly offbeat and surreal (think Tate bricks or Tracey Emin). However the building itself was great to explore and the top level offered a pleasant cafe in which to reflect on its current purpose. Better to reuse than demolish seemed to be most people's verdict.

Reflections

Artistic interlude over, we walked to the Old Square – looking very similar to Krakov but in fact substantially rebuilt in original style after the war rather than original. We popped into a bar with its own underground brewery and then had a final meal to reflect upon a splendid weekend.

Although the purpose of the Riese sites has been widely speculated on by conspiracy theorists (supported in part by Albert Speer's memoirs), I personally doubt they were built as the site for secret 'terror weapon' development or a repository for plundered gold or even as a last redoubt for Hitler. My own feeling is that they were intended as underground factories; the area was rich in coal supplies and there is evidence of extensive power supplies and transport infrastructure. But perhaps we will never know for sure.

For anyone that wants to follow in our footsteps, all of the sites operate as museums and the web links are below. Chris Wilkins may well be arranging repeat visits for those who prefer to let others do the organising. Wrocław is set to be the European City of Culture in 2016 so travel soon to avoid hikes in hotel prices!

I'll leave the final word to Chris Wilkins:

"If anyone ever thinks that arranging a trip for 18 people is easy they really need to think again and try it! This was the first trip organised by the 'eFortress' group and we wanted it to be as perfect as possible. All was planned and arranged to the tee or so we thought! The accommodation turned out to be more than acceptable and catered for

most (although we did have to change hotels after the first choice went bankrupt).

However not having a signed contract with the coach company turned out to be a mistake as the coach was three hours late on the first day. We tried wherever possible to book guides at the various locations. Again this was all settled beforehand; alas upon arrival this did not work out as they either were sick or turned up late if they even bothered!

On the whole though we had a fantastic time and everyone was very understanding and I believe enjoyed themselves. Lessons were learnt and notes taken and I'm sure we will endeavour to improve on shortcomings for future 'eFortress' trips. The next trip (in April 2015) should be happening around the time you are reading this.

Responding to feedback, we will include more sites off the tourist trail. We will be also look at creating a photography group separate from the main group as some people want to wander and take in sites using their own senses whereas many photographers tend to want a landscape free of humans to record and then move on.

I hope many of the Project Riese attendees will attend future trips and would like to thank everyone who made this possible."



This rather dramatic piece of modern art acts as a signpost to the Contemporary Art Museum in Wrocław It reflects the fact that the city was and still is an important location for the manufacture of rolling stock (including the bogies for Manchester trams). Photo Steve Madden

References

Bartosz Rdułtowski **Postwar secrets of the Owl Mountains** Technol 2012

ISBN: 978-83-60762-35-6

Some background information and tunnel plans from Wikipedia

Useful websites

wlodarz.pl/ Die Glock site and Włodarz Museum

www.sztolnie.pl/ Rzecznka Museum

www.grodnozamek.pl/ Grodno Castle

www.osowka.pl/ Osowka Complex

www.en.ksiaz.walbrzych.pl/ Książ Castle

muzeumwspolczesne.pl/mww/?lang=en Wrocław Contemporary Art Museum



Visit to Canal Tunnel

Granada Studios - Manchester

Keith Warrender



The second trans-shipment dock, with the facing blast wall built into the arch. The passageway set into the tunnel on the right which led to a hoist has been recently blocked off. Photo Nick Catford

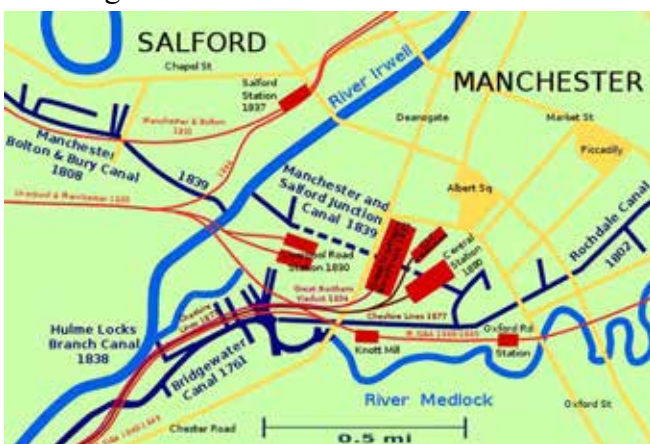
Ever since I began researching underground Manchester I have been trying to get access to the western section of the Manchester and Salford Junction Canal tunnel which is beneath the old Granada Studios in Manchester. Letters, emails and phone calls have not been productive, nor was a direct approach to one of its presenters who made a broadcast down there. You can imagine my surprise and delight when I received an invitation from Nick

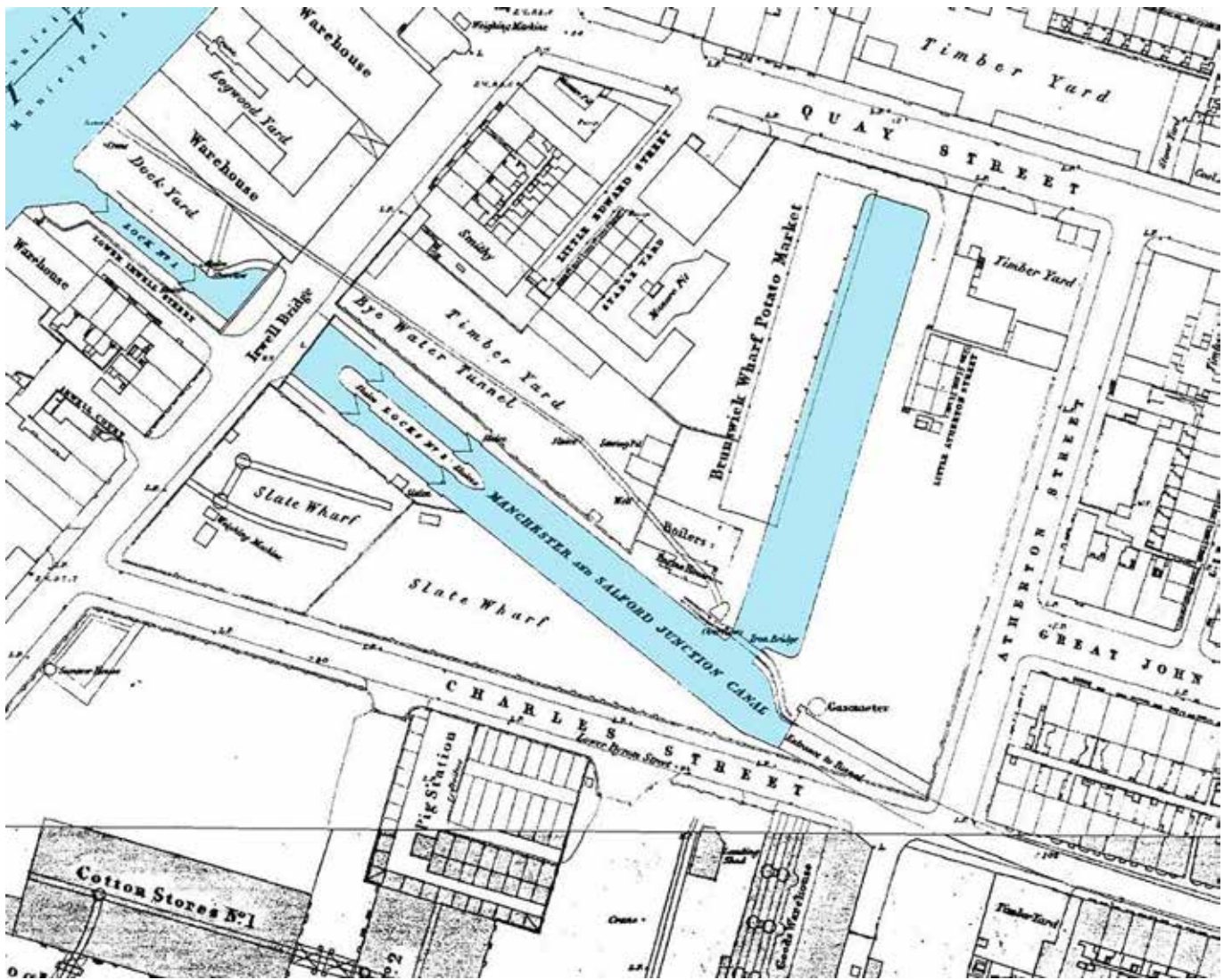
Catford to join him and other Sub Brit members in a visit to the tunnel this March.

You may know that Granada are in the process of relocating to Salford, with the old site being redeveloped by Allied London in partnership with Manchester City Council. It is to be a mixed development with housing along with warehouses, markets and an arts and creative sector centred around the old studios. The new owners wanted to find out more about the history of the canal tunnel and agreed to allow Sub Brit down there in exchange for a set of photographs by Nick Catford, and copies of my two books on the subject. So after years of trying, Sub Brit had come to my aid with a rare opportunity to see the tunnel.

An underground gem

The tunnel is one of Manchester's underground gems, opened in 1839 to form a link between the Rochdale Canal and the River Irwell. Only about 500 yards of the 1100-yard-long route is underground.



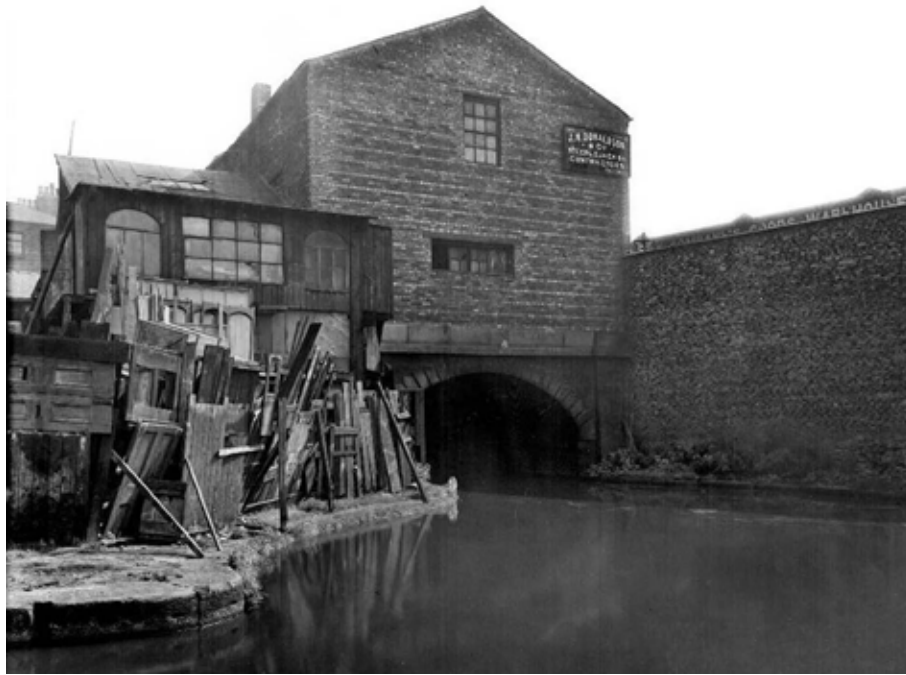


1850 1:1,056 OS Town Plan shows the west end of the canal and the west portal of the canal tunnel on the north side of Charles Street (later renamed Grape Street). After leaving the River Irwell, the canal passes through a single lock and, on the east side of Water Street, two parallel locks before reaching the tunnel. Immediately west of the tunnel the Brunswick basin runs north to Quay Street. The open section of the canal east of Water Street was lost when the Granada Television Centre was built in 1956; the entrance lock is extant

Rare official photo of the M & SJC tunnel during the wartime. The old topath is on the left, and the women and children are sleeping on park benches. They are closely huddled together, but they probably lived in cramped conditions at home

It is thought to be of a 'cut and cover' construction and it rises 40ft from west to east by means of four sets of locks. The canal was never a commercial success and a section was back-filled in 1875 and Central Station built on the site. The remaining section through the tunnel gained a new lease of life in 1898 when the Great Northern Railway Company





Western portal of the tunnel coming off the River Irwell near Grape Street which is behind the wall on the right. Brunswick Basin is to the left.

built a warehouse, and utilised the waterway under the building. The company constructed two trans-shipment docks under the warehouse with shafts taking the goods to its six floors.

The tunnel was just wide enough for boats to pass side by side. It was lit with gas lamps every twenty yards and boats were required to carry a light both fore and aft. The few passenger boats which used it had priority over goods barges. These were just a few of the thirty-six rules of the 1862 Merchant Shipping Act which had to be observed in the tunnel.

Commercial traffic through the tunnel had dwindled by the 1920s and it was officially closed in 1936. During WWII, the tunnel was drained and used as a shelter for about 1400 people. It was one of the most popular shelters in the City and people came from surrounding districts because they thought it to be safe and secure. As a result, a ticketing system was introduced to give local residents priority. The tunnel was divided into sections by means of sixteen blast walls to prevent fire or bomb damage spreading throughout

its length, and it was accessed through six entrances.

Nuclear shelter

After the war, the tunnel was kept as a shelter in case of nuclear attack and remained closed to the public. The Granada TV company purchased the section of the tunnel under their property in 1955 to use for film editing and processing but quickly decided it was not suitable and put it up for sale. There were no buyers and it remained in their ownership until their recent move to Media City at Salford Quays.

Since about 2008, I and others have been giving conducted tours through the dry eastern end of the tunnel from Watson Street to just beyond Deansgate. Groups can go no further without the aid

of a dinghy or else go equipped with waders. The water which has seeped in along the next stretch through to the Granada section is four feet deep, and although it looks quite clear it will be quite heavily contaminated and should not be disturbed. Sub Brit members enjoyed a look at the tunnel during their Manchester weekend in 2011.



Two wagon hoists at the eastern end, beneath the Central Station goods yard, built around the time of WW1, but not used much beyond that period. Goods could be taken this way to Manchester Docks. Later arching now surrounds the hoists.

Photo (November 1994) Nick Catford





The canal joins an arm of the Rochdale Canal; which is seen on the right. There is a stop lock on the west side of Lower Mosley Street followed by a flight of two parallel locks before the canal enters the tunnel at Watson Street. This open section of canal was lost in 1875 when Manchester Central station was built; the station opened on 1 July 1880.

On the tours, I point out various remains from its use as an air-raid shelter – public notices on behaviour, toilets and wardens’ posts etc, along with evidence of temporary structures erected to keep out damp and cold. Other features include a vast chamber at the Watson Street end, built with the construction of Central Station where there are the remains of a wagon-hoist to transport goods from the canal to the railway.

About two years ago, the Great Northern, owners of the property where we access the tunnel, stopped allowing us to conduct tours for health and safety reasons. There is only one way in and out, except for a climb up a tall precarious ladder to a car-park which would admittedly be difficult for the public. The property is under new management and I had a meeting with them about how they might improve the visitor experience with a few safety improvements and additional lighting. The management seemed in broad agreement with this and then word came through that the health and safety issues were not as serious as first thought, and the tours would be resumed. I have been assured that it is to reopen sometime in April.

So to the visit to the closed-off section under the former Granada studios on Thursday 12 March.

This had been arranged between Sub Brit and Andy Rain of RoC Consulting, the civil and environmental engineers who are working with the new owner, Allied London, on the development. Sub Brit are experienced in doing the ground-work for site visits like this, and had done the preparatory work on potential hazards, and appropriate insurance cover was in place. Crucially it had been agreed that the security fee should be waived.

The party comprised of Nick Catford, Phil Catling, Bob Clary, Claire Butterfield and myself met up at the site and were taken by a security person to the tunnel entrance. The route took us through the former Granada production studios – vast spaces now quiet and deserted, used only for occasional corporate events, although the owners hope they will be used more fully in TV and film production again in the future.

Last-minute hitch

We assembled by the door to the tunnel which was plastered with a variety of warning notices – none of which were quite appropriate – and then the security man’s phone rang. There was a problem about our going into the tunnel. Apparently someone else in the organisation had intervened to insist that we did have to pay a security fee of £80. Nick said that

this was not the case and so, frustratingly, we had to wait while phone calls were made to sort out the misunderstanding.

We whiled away the time chatting. I talked to Phil Catling who is a manager with Stockport Council and involved in the management of the wartime underground shelters, and he told me they are very popular and 30,000 people visit each year. Nick and Bob enjoyed a bit of banter on their respective ages.

At last the call came through – the matter had been resolved and we could go in. Now by Sub Brit standards this space was pretty tame stuff. Indeed we didn't actually go underground – here the towpath was at ground level, although the floor of the old air-raid shelter was about ten feet below us, submerged by water.



The first main section at the Grape Street end, with the remains of the structure to keep out the damp and cold in the shelter clearly seen on the back wall. Photo Nick Catford

From the entrance door there was a short corridor which turned left into a small area with a blast wall facing us. A hole had been knocked through in order to enter the next section. Then there were two further sections, each a hundred ft long between the

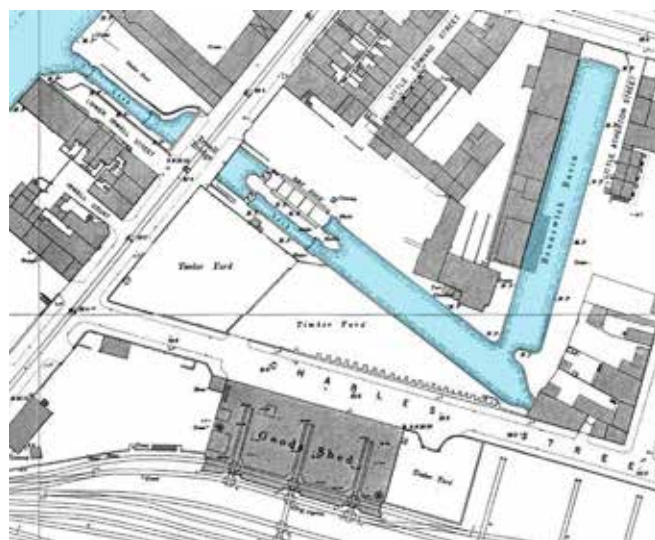


The half-flooded wardens' post seen from the towpath, in the clear but stagnant water. Photo Nick Catford

blast walls. It was noted that the blast wall nearest the entrance was considerably thicker than the next one, presumably for protection from fire and bombs. Again in this part of the tunnel, the water was remarkably clear. There were a few bits of rubbish in it, including a metal trolley.

Put that light out

The party split in two – Nick unpacked his photographic gear, and the rest of us disappeared in the darkness to the other end of the tunnel to explore and to take our own photographs. Occasionally, we would hear Nick telling us to put our torch lights out while he took the shots.



1891 1:500 OS Town Plan shows the west end of the canal. The east end and been infilled by this time during the construction of Manchester Central station. One of the parallel locks has been converted into a dry dock.

The brick tunnel walls were very damp and there was a constant drip of water coming down from the ceiling and walls. There were a few indications of its former use as a wartime shelter, with bay numbers

on the blast walls and a wardens' post. Wartime newspaper reports suggest the wardens were kept busy with constant bad behaviour from drunken men and women who staggered in causing fights and quarrels and vandalising sandbags and anything else they could find. They often needed first-aid after falling over, or they were vomiting. Often there was fighting and bad language, and the police would be called.

The problem is highlighted by the remains of a notice in the section under the Great Northern complex which instructs people that there was to be no smoking, insobriety, gambling, rowdiness or unseemly conduct – clearly it would be quite a boring night for many! However it was not only the drunks who caused problems; children were thought to be responsible for a huge amount of damage during the daytime, even though the shelter was supposedly closed. The Manchester Emergency Committee reported in 1941 that just about every item down in the tunnels was either vandalised or stolen.

Despite the bad behaviour of a minority, the wartime spirit prevailed and there were various measures to ensure that the time spent down there was as tolerable as possible. Drinks and refreshments, organised by voluntary organisations, were served from the wardens' post, and there were separate first-aid rooms for men and women.

Following the Home Secretary's instruction that the public should be as cheerful as possible, some wardens organised sing-songs, although one 'jobsworth' police constable ordered the people to stop after a ten-minute rendition of the latest



Blocked off air-raid shelter steps to Grape Street. People must have exited from here uncertain whether they had a home to go to after the night's bombing. For others, it would be straight off to work. Photo Bob Clary

dance hits. He told them that they would have to leave unless they stopped. It was pointed out to the over-zealous bobby that he would have to take responsibility if they were killed or injured on leaving the shelter.

As the war progressed, further measures were taken for the shelterers' well-being. People organised the regular cleaning-out of the shelters, and activities for young people were introduced with games, films, travel talks, singing, elocution lessons, concerts and lantern slide lectures. But there were still complaints about young children inevitably congregating in groups causing trouble. There was the 'damning' comment about the teenagers – they never read and the girls don't knit!

A new medical problem

Inner walls were constructed in some parts to direct the water off the people and into drains. In the Granada section there are signs of a roof structure on the blast walls. This was a tent-like installation which made it warmer and kept the water off those trying to sleep on the cold, hard concrete floors. Others tried to make it more of a home from home with old armchairs, park benches and deckchairs. The latter brought about a new medical problem – 'Shelter leg' – a swelling and pain in the legs caused by prolonged hours of sitting with legs over the cross bar of the deck-chair. People took their own bedding, and many slept on the newly-installed wooden bunk beds along the tunnel walls.

We saw the wobbly plank which led down to one of the sets of steps up to the street. The way is now blocked off but during wartime there would have been a trapdoor in the pavement, with handrails and lighting on the steps. The wartime authorities built protecting walls in front of the blast wall doorway. This space has since been infilled and is partly under water which means the only way along this part of the tunnel is by towpath.

There did not seem to be any remains of wartime notices just below us on the towpath wall. It's hard to image that this quiet damp space once thronged with chattering people and frightened children who must have been wondering what was happening above ground as they heard the sound of the bombs crashing down onto the city. Records show that 684 people died in the Greater Manchester area bombing, and a further 2,364 were injured.

Andy Rain came to the site with us, and in conversation, it was apparent that the new owners had no plans for the tunnel to be generally open to

the public. They would just maintain it in its present condition. Possibly, groups could ask for permission to see it, but judging by the difficulties that even a seasoned group like Sub Brit had in gaining access, it seems unlikely that many will actually see it.

I enquired about the possibility of opening up the whole tunnel for tours but there is no enthusiasm for such a bold project from either the Great Northern or Allied London people. It is a shame, and although I appreciate there are organisational and financial difficulties – it would make a great visitor attraction.

Although there were no real surprises for me in this part of the tunnel, I really appreciated seeing it for the first time. Towards the end of the visit we compared photographs. Nick was the last out with a picture of the entrance, and then there was just time for group photographs before I left the Sub Brit party who were off to find lunch in Manchester. I look forward to the next underground space Sub Brit can find in Manchester.



The Sub Brit party at the entrance to the canal tunnel at the rear of the Granada Production studio. They are from left to right: Phil Catling, Nick Catford, Claire Butterfield, Bob Clary and Keith Warrender. Photo Bob Clary

Editor's Note

Keith Warrender is the author of *Underground Manchester* (Willow Publishing 2007) and *Below Manchester* (Willow Publishing 2009).

Some thoughts and questions on life in and life after Burlington and nuclear bunkers in general

Paul W. Sowan

We understand from Nick Catford's splendid book on **Burlington** and Martin Prosser's review of it (*Subterranea* 31, December 2012) that those who were to serve in this ultimate hiding-place under nuclear attack would have had no advance notice of or training for their role. These poor souls would be whisked into the rat-hole, possibly never to see their family and friends again.

This poses unanswered questions! Whilst clearly the remaining physical evidence, as seen in Nick's photographs, provided for material needs, what thought was given to the mental health of those conscripted?

When, in or about 1961, I applied for a post with the British Antarctic Survey, I was 'positively vetted' which meant those who knew me best were quizzed as to whether or not I would be good company snowed-up for several months with others in very close confinement in 24-hour darkness near the South Pole! I was not selected, by the way, because vegetarians could not be considered: as the man said, 'all the rations have been out there for several years already, and we don't propose to go round changing them all just for you!'

Were Burlington conscripts assessed in any way before being chosen? Was the bunker supplied with calming medication? Was thought given to the likelihood of staff committing suicide, or running amok? Were there detention cells, a mortuary, or stores for weapons? And what about the mental stability of those who unexpectedly

found themselves in charge of any such provisions?

And when the food and water had run out, what was the drill to be for those emerging into an irradiated cinder that was once Wiltshire? NBC suits, made-to-measure for venturing outside? Radiation monitors? Transport and containers for collecting any safe food and water that might be found? Guns for shooting half-dead and fully-crazed survivors who also wanted food and water? Although the physical preparations for the Government's (quite possibly very brief) survival are now in the public realm, there may perhaps, or may not, be answers to such other questions still hidden in the archives.



One of the kitchens in Burlington. Photo Nick Catford



Sub Brit Site Visit

Ramsgate Tunnels and Fan Bay Deep Shelter - Kent

Tim Wellburn, Gordon Wise & Derek Smith



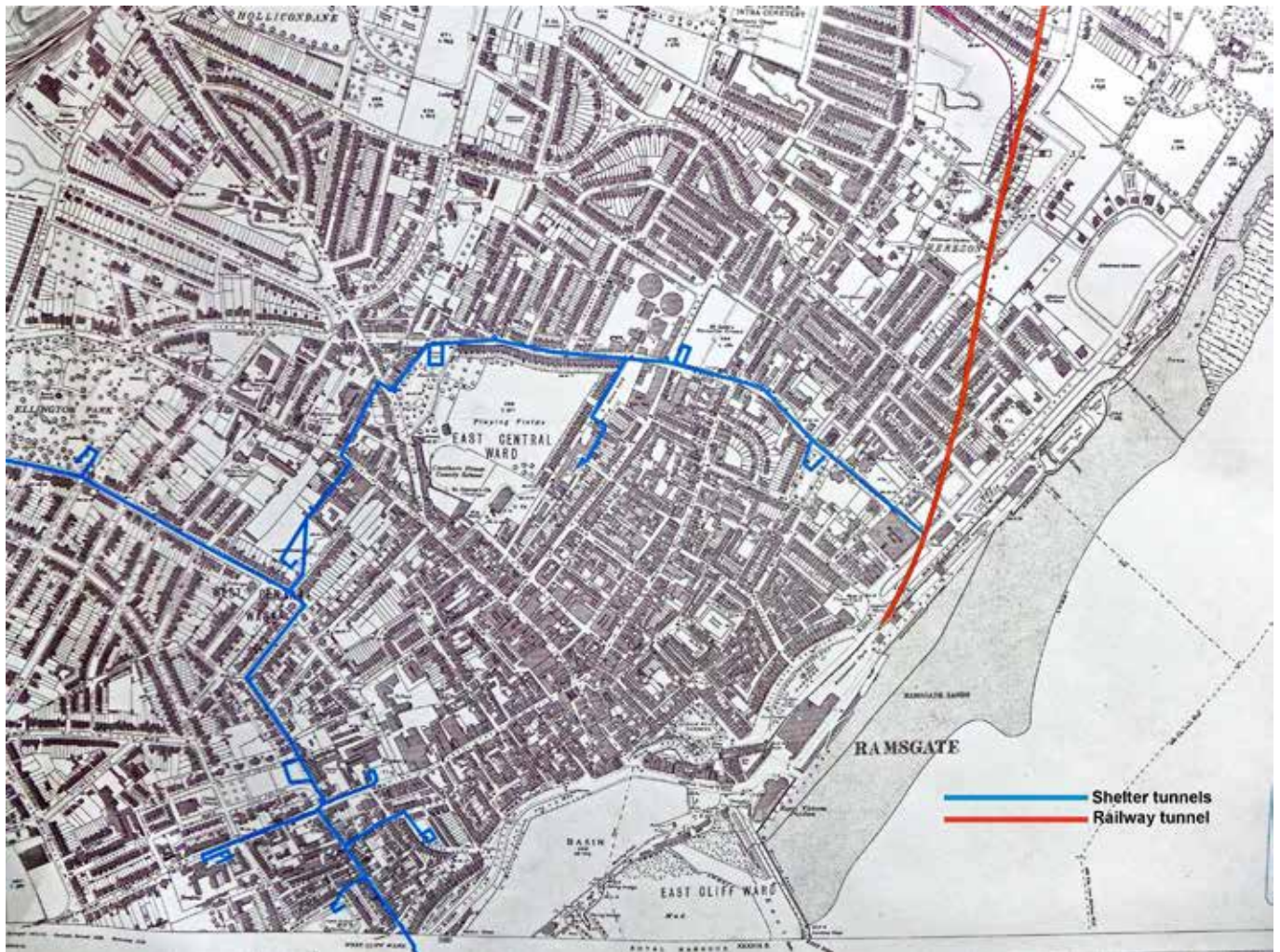
Sub Brit members gather at Ramsgate Tunnels' harbour portal at the start of the visit. Photo Clive Penfold

SubBrit members' interest in these two exceptional sites was such that the trip was fully subscribed on the day it opened for booking. Fortunately, with some swift footwork, Chris Rayner was able to persuade our hosts to accommodate a second wave of Sub Britters, alternating morning and afternoon visits to the two sites. Presumably, somewhere on the Kentish littoral, we must all have crossed paths.

An early start was called for: east Kent is a long way from almost everywhere else! I had certainly heeded Chris's warning: "It can be pretty cold walking across the headland to Fan Bay, so wrap up warm." In the event, we were blessed with an exceptional, sunny day and excess layers of clothing soon had to be peeled off. Arriving in Ramsgate, we admired the Victorian architecture and, more parochially, diverted to an



The same view when Sub Brit last visited the Harbour Tunnel as part of the Kent Study weekend in 1997. The old scenic railway platform is seen on the right. Photo Nick Catford



Ramsgate street map shows the tunnels and shelter entrances

interesting Belgian seafront cafe to find a much needed coffee (too early for a Trappiste), still managing to report on site, on time.

Ramsgate Tunnels

The Ramsgate Tunnels were comprehensively documented in 2011 by Phil Spain in *Subterranea 27*, and are also the subject of a monograph by Nick Catford. As a result, they are probably too well known to require much introduction.

In 1938, Ramsgate's Mayor, A.B.C. Kempe, had fought to overcome Home Office resistance to the shelter plan, drawn up by Mr R.D. Brimmell, the Borough Engineer, who also oversaw construction. This was undertaken in 1939 with necessary, but nonetheless quite remarkable speed. (In the 1950s Mr Brimmell produced plans to reopen and expand the tunnel system as a

Cold War air-raid shelter, but nothing of this seems to have been implemented.)

Those who had pursued the references provided in Chris's briefing note (or dug out *Subterranea 27*) came armed with a plan of this extraordinary network which extends well over three miles – and could accommodate 30,000



Shelterers in the Harbour Tunnel pose for the camera man during WWII. After the war the scenic railway reopened and remained in use until 1965



people. Served by eleven entrances and ten ventilation shafts, the purpose-built tunnels were cut in an arc around the town centre from West Cliff Harbour to link up with the then still extant Scenic Railway tunnel which, in turn, had utilized the last 800 yards (732m) of an abandoned mainline tunnel.

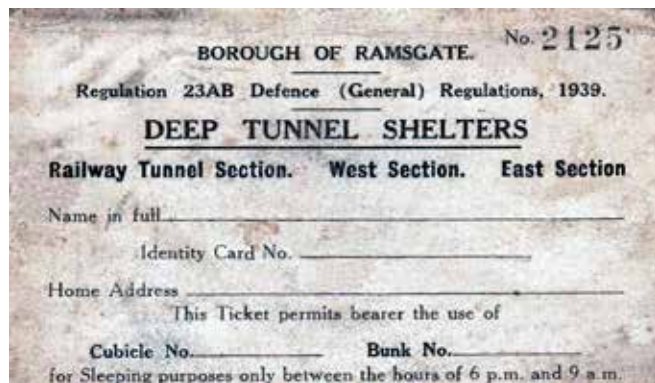
The latter had once brought the line of the Kent Coast Railway (from 1871, the London, Chatham & Dover Railway) through to its Ramsgate Harbour terminus, but both station and tunnel were closed in 1926 by the new (post-1923 Railway Grouping) Southern Railway, following its rationalisation of the local rail network.

Derek Smith updates the story of the restoration and reopening of the Tunnels since Phil Spain's article in *Subterranea* 27 (September 2011).

The current situation

As those of you who may have visited the Tunnels before we opened to the public will have seen, we have made great strides in clearing and presenting the Tunnels in the way we always wanted. Having cleared the mass of rubble, about 90 tonnes, from the main railway tunnel the base was levelled and 'type one' was laid in the hope that it would consolidate and form a good surface. Unfortunately this has not been the case and at present we are considering alternative floor coverings to make us a bit more wheelchair-friendly.

Our aim has always been to tell the story of both the importance of the railway tunnel in the development of Ramsgate as a holiday destination, and the importance of the ARP tunnels in preserving civilian lives during the air raids endured by the town in WWII.



Although we knew there would be considerable interest in the reopened Tunnels, I think that even we were taken by surprise at just how many people have visited, and continue to visit them. This has had a two-fold effect with the result that we have been able to keep the Tunnels open all year, but also means that our guides are fully stretched taking tours round with little time left for increasing and improving our display items.

If we have a wish list it will include extending the Tunnel Town section of the tour, providing more bunks and benches in the ARP tunnels to better illustrate the cramped conditions, and provide better photographic interpretation of both the railway and shelter tunnels.

To this we have to add the more mundane things like planning and implementing fire precautions, business plans, budgets, commercial and marketing policies, guide training and so on

As for extending public tours into the parts of the railway tunnel we let the Sub Brit party into, we have a few problems with emergency escape provision – our insurance limits us to being within a certain distance from an exit to start with. There is also the obvious problem in the ARP tunnel of the Boundary Road blockage, which would take a lot of money and considerable professional help to clear.



These letters advertising the Tunnel Railway were fixed above the Harbour Tunnel portal – now they lean against the wall in the tunnel. Photo Nick Catford

Nothing is impossible of course and so far public response has been very good with comments favourably comparing our tunnels' more raw state to the somewhat clinical presentation at Dover and elsewhere. Our intention has always been to maintain as far as possible the original fabric of our tunnels so that future generations can experience what it would have been like to live underground in Ramsgate during the dark days of the 1940s, and to appreciate the far-sightedness of Richard Brimmell in planning and seeing through the construction of Britain's largest civilian Air Raid Precautions Tunnel.



The Scenic Railway tunnel diverging from the mainline tunnel. Photo Tim Wellburn

Sub Brit visit February 2015

In the brick-lined double-track mainline tunnel we were generally left free to wander around at will, although our hosts were on hand to answer questions, drawing on their very extensive knowledge. We duly inspected the curious brick-built chimney, set in the middle of the tunnel arch and seemingly exhausting through one of the tunnel's original vents; two blocked ARP entrances; and then the Scenic Railway spur off to the left – to which we would return.



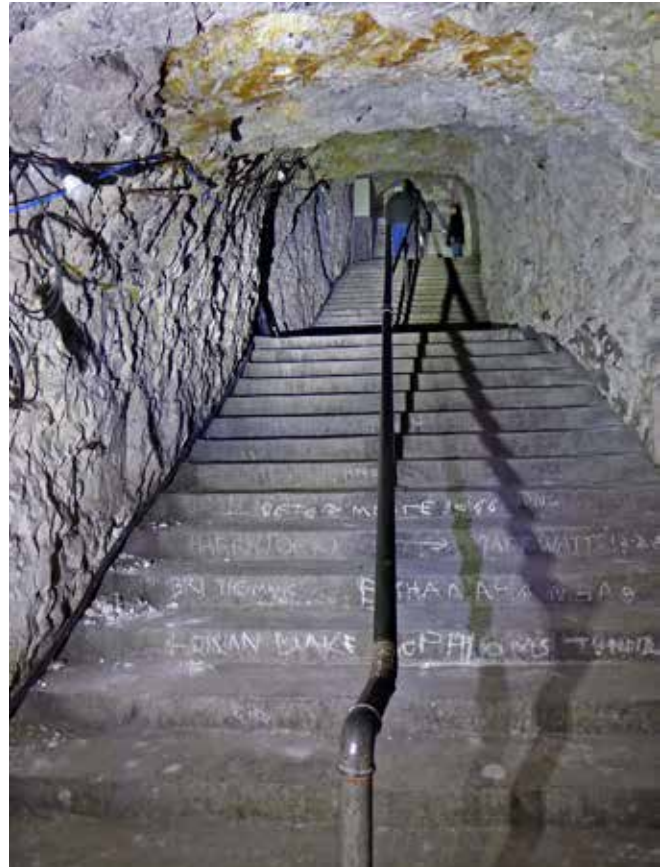
*The Scenic Railway tunnel looking towards the Hereson Road terminus: note the restricted loading gauge.
Photo Tim Wellburn*

We reached the main tunnel's walled-up northern portal after a surprisingly long walk (surprising, at least, for those of us who had failed to spot the discontinuity symbol on the thus foreshortened plan: the tunnel actually runs for 1,124 yards/1,028m). The public are not taken this far, and accordingly they miss the wonderful set of ancient rusting dodgem cars, seemingly gathered for some forgotten ritualistic purpose, at this end of the tunnel. (The other notable artefact, displayed at the entrance, is the almost complete set of "TUNNEL RAILWAY" lettering, once affixed above the Harbour Portal.)



The chalk-cut ARP tunnel, close to its junction with the mainline tunnel. Photo Kenneth Barclay

We backtracked down the mainline tunnel (literally: a prevailing 1-in-75 gradient) to inspect the much shorter (300 yards/274m) but also much steeper (1-in-15) narrow-gauge spur tunnel of the Scenic Railway. At 8 feet/2.4 m high and 6 feet /1.8 m wide, there cannot have been much clearance for the electric locomotives' 400-volt DC overhead power supply. Evidence of the sleepers was still clearly evident in the ballast in this tunnel, which were able to follow up to its own – similarly blocked – northern portal. Beyond this once lay the line's Hereson Road terminus, serving nearby Dumpton Park mainline station – and the greyhound stadium! The Scenic Railway managed to resume operation postwar, surviving until 1965.



ARP stairs to the Arklow Square entrance cut in the chalk: the next flight up is concrete-lined. Photo Tim Wellburn

Regrouping near the main Harbour entrance, we then sorted into the purpose-dug air-raid tunnels, or at least, into the section that is currently publicly accessible (including to us). Tantalisingly, three-quarters of the system lies beyond the roof-fall we reached just after Airshaft 7. These tunnels are cut through the chalk and remain unlined. They are slightly smaller than the Scenic Railway Tunnel, measuring 7 feet high by 6 feet wide (2.15m x 1.85m) with bays off (some now furnished with Elsans), and lie at a depth varying between 50–75 feet/15–23m below the surface. They were expected to give protection against overhead hits by 1000 lb (450 kg) bombs.

The SubBrit groups were escorted through this section in between public tours, our electric hats (rather than





Beyond airshaft No.7 the tunnel has collapsed. Access to the tunnel beyond this point is accessible from another entrance. Note the water tank to the left. Photo Tim Wellburn

any other eccentricity, I believe) causing some interest amongst the uninitiated. Having reached the roof-fall, after examining en-route the stairs up to the Arklow Square and St Luke's Recreation Ground entrances, we returned, blinking, into the sunshine, bade farewell to our hosts and set our satnavs for South Foreland Lighthouse and Fan Bay.

Fan Bay Battery and Deep Shelter

When war was declared against Germany on 3 September 1939 it would be fair to say that Britain was not ready.

Certainly since Chamberlain's meeting with Hitler in 1938 and the subsequent "peace in our time" note, strides had been made to re-equip and re-arm the British Services. But by that fateful Sunday in 1939 the British forces were still a long way behind the German military machine.



One of the 6" guns at Fan Bay Battery

The period between the outbreak of war and the spring of 1940 is often referred to as the 'phony war'. Nothing really appeared to happen. Certainly there had been attacks on shipping but the expected "rain of death from the skies" had not materialized and the British public continued life in much the same way as they had always done. The British Expeditionary Force

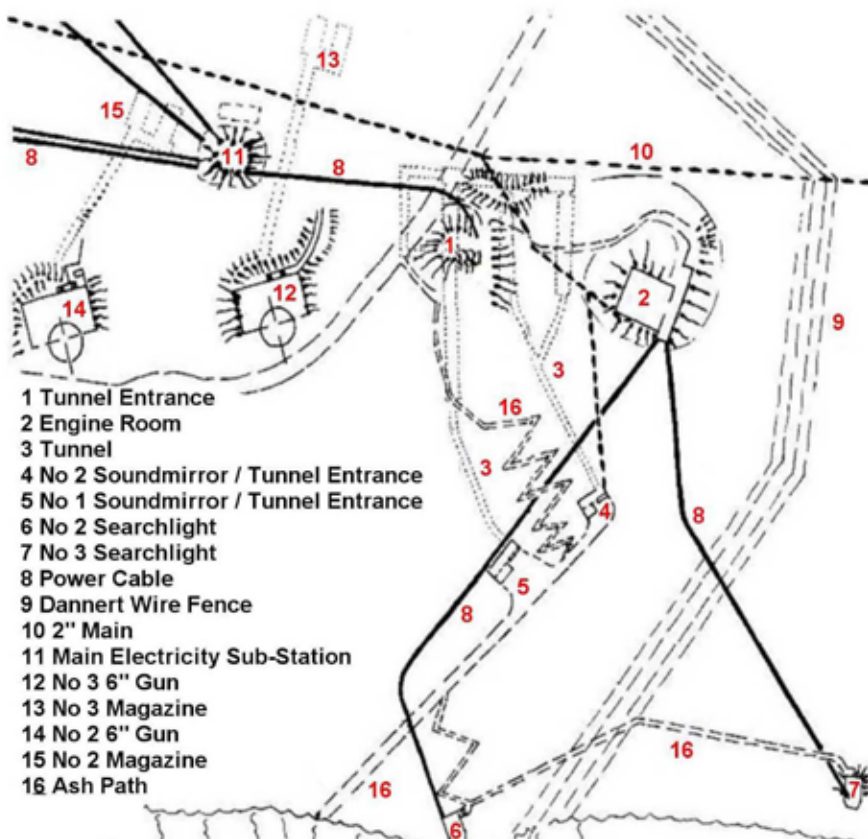
had been dispatched to France along with squadrons of the Royal Air Force, all designed to show the Germans that Britain stood shoulder to shoulder with our French Allies. However reports came back to Britain of nothing really happening in France and it all appeared much ado about nothing.

That was the case until May 1940 when the German military machine commenced "Fall Gleb" (Plan Yellow). For the first time the British, French and Belgian forces experienced coordinated mechanised warfare – swift, decisive and deadly effective. The Allies fell back under the seemingly overwhelming forces against them. Spirited defensive actions by ground troops and countless sorties by the RAF did not seem able to stop the relentless onslaught.

By the end of May the remaining men of the BEF were just holding onto the Channel ports of Calais and Dunkirk, while the 51st Highland Division attached to the French 2nd Army were falling back towards Le Havre hoping for evacuation from there. All over France the situation was chaotic and the German forces were exploiting this chaos.

Fan Hole Battery

Redrawn from 1943 War Department Plan



Operation Dynamo

In Britain Admiral Ramsey, from his headquarters in Dover, masterminded Operation Dynamo, the evacuation of the BEF from Dunkirk. With the now famed story of the little ships and Royal Navy destroyers working round the clock over 300,000 men were evacuated by the time the operation was declared over on 3 June 1940.

On 10 June the remaining eight thousand men of the 51st Highland Division surrendered at St Valery and ten days later the *Lancastria* was sunk off St Nazaire with the loss of five thousand troops and crew.

All allied operations ceased, the Battle of France – as General Weygand called it – was over the Battle of Britain was about to begin; the commencement of that strategic air battle started on 10 July.

During the same month Churchill, now Prime Minister, was making one of his regular visits to Dover which was now a front line town, and upon observing a convoy of ships asked if they were British. The embarrassed answer was no, they were German. Churchill was incensed that enemy shipping was using the Dover Strait unopposed and sent this memo to the Joint Chiefs of Staff:

‘We must insist upon maintaining superior artillery positions on the Dover promontory, no matter what form of attack they are exposed to. We have to fight for command of the Straits by artillery, to destroy the enemy batteries, and fortify our own.’



The two sound mirrors. The earlier 15' mirror dating from WW1 is on the right. The adjacent 20' mirror was built in the 1920s. Photo Jon Barker

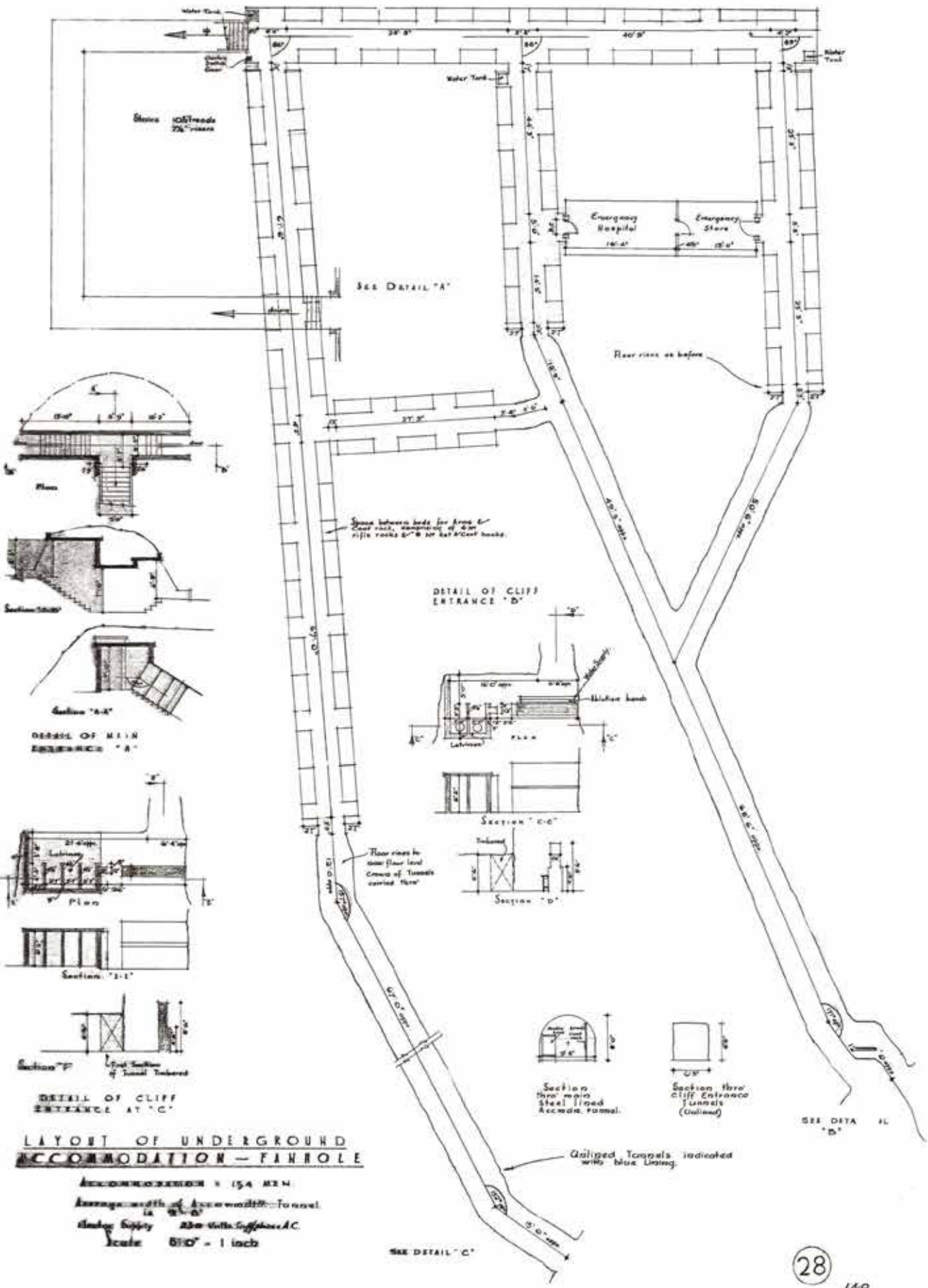


The Emergency hospital and emergency store were located in the cross passage in the Fan Bay shelter. This view is from March 1995. The shelter has always been open and has remained in remarkably good condition considering the access point was a few yards from a public footpath but easily missed if you didn't know it was there. Photo Nick Catford

As if underlining the point, the first German shells fell on Dover on 12 August 1940, all fired from the German Railway Gun K5. In that attack two people were killed and three injured. Shelling would continue until 26 September 1944 when the area around Cap Gris Nez was taken by the Canadian 2nd Army and the German batteries were neutralised. In all over eight hundred Dover civilians would lose their lives in those four years and over two thousand would be injured.

A meeting took place on 3 September 1940, a year after war had been declared, in response to Churchill's note and subsequent order that 51 new guns were to be installed between the North Foreland and Dungeness. The next day Brigadier Burrows was dispatched to search for suitable sites to mount these guns and on 6 September the site at Fan Bay was selected. By the end of that month the site had been confirmed and detailed plans were then drawn up. The Fan Bay Battery had been born.





LAYOUT OF UNDERGROUND ACCOMMODATION - FANHOLE

ACCOMMODATION = 154 MEN
 Average width of Accommodation Tunnel is 24'-0"
 Supply 2500 Galts. Supply A.C.
 Scale 5/16" = 1 inch

Fan Bay Battery is built in three months

As planned Fan Bay Battery consisted of three Mark XXIV six-inch breech-loading guns mounted on Mark V mountings, each housed in their own emplacement with their own underground magazines located at the rear of each gun. The site also had above-ground accommodation in huts, cook-house, a sunken battery plotting room, electrical generator house and sub-station, workshops, searchlights on the cliff edge along with battery observation posts and radar equipment. Finally 23 metres (75 feet in old money) below the surface, 3500 square feet of steel-lined tunnels were constructed to form an underground shelter for the battery personnel.

The construction of the tunnels was completed by the 172nd Tunnelling Company, Royal Engineers between 20 November 1940 and 28 February 1941, one hundred days of construction.

There had been small tunnels cut into the cliffs next to the two Sound Mirrors and it is most likely that this formed the start position for the company to dig the tunnel complex. This has been deduced by the fact that a small “hand pushed” railway ran from this start position to the cliff edge and was obviously the quickest way of getting rid of the spoil – straight over the cliff edge. Additionally at these lower entrances ablution blocks were built.

Starting from this lowest point two drift tunnels 6’6” by 5’6” were driven into the

chalk. These then opened out into six 9’ by 8’ chambers which were supported by steel arches (two-piece colliery arching) planted at 2’ 9” centres and then covered with heavy-gauge corrugated steel “thereby creating a soundly constructed shelter”, to quote the war diary of the company. Entrance to the tunnel complex was via the two drift tunnels and one 35-degree inclined stairway of 125 steps leading to the surface. At this higher entrance there was a plant room and shelter entrance. These would have been covered with an earthen bund. As originally designed the shelter was designed to provide accommodation for four officers and 185 other ranks.

It is believed that the surface works of the battery and the fitting out of the tunnels was carried out by the 203rd Pioneer Company, Royal Engineers. This has been assumed from numerous pieces of graffiti pertaining to this unit found in the tunnels.

Once the site had been selected and construction commenced, the first two guns arrived at Dover on

1 November 1940 and were established in the open gun pits as soon as parts allowed. Both guns were in position by 26 November and their mounting overseen by Lt Col Shrive, Fire Commander designate. The third and final gun was mounted in its pit on 6 December. However much work still needed to be completed before the battery would be operational. For speed of construction the guns were originally mounted in open gun pits. Later each gun would be taken out of service in turn to have a brick and concrete shelter built over it.

In the words of the Fort History taken from the Fort Record Book (WO 192/201), “construction proceeded slowly in a sea of mud and under many difficulties due to lack of labour and supplies.” However the first fort personnel arrived on 10 December 1940 when four officers and one hundred and eighteen other ranks of the 203rd Coast Battery, Royal Artillery joined from Falmouth.



Artist's impression of the shelter in use. Photo from IWM

The first shots are fired

Although the building work was slow it was largely complete by 28 February 1941 and it was on this date that all three guns were ‘proof-fired’ by firing three rounds apiece, thus proving the mountings. Building work continued on the site and it is probable that this continued until August 1941; again graffiti shows us that the Pioneer Battalion was still on site.

Fan Bay was technically a very advanced fort embracing the latest radar and plotting equipment and that made it a prime target for visiting dignitaries. During the early part of its life it hosted many visits from senior Generals and War Office staff and attracted the attention of Winston Churchill, who visited for the first time in June 1941.

The American Secretary of State for War Henry L. Stimson was accompanied by two senior British generals, and the Corps Commander of 12 Corps, Lt Gen Montgomery, visited the fort just prior to being sent to Egypt. Not only were the officers and men of the 203rd

Battery training and getting their fort ready for action, but it would seem that certainly the officers were becoming very proficient at hosting high-ranking guests.

On 11 November 1941 the Fan Bay Coast Defence/Chain Home Low (CD/CHL) radar obtained contacts at about 21,000 yards, not far off the maximum range of the guns. All three guns went into action and the target, believed to have been a German merchant vessel, hightailed it back to Calais. No hits were observed but the vessel certainly received a large shock!

It would be the beginning of 1942 before the Battery would be in action again, this time closer to home. The targets were E-Boats, more properly called S-Boats (*Schnellboot*), which were operating close to the Eastern Entrance of Dover possibly mine-laying. Fifteen rounds were fired in the twenty-minute engagement but no hits were recorded.

This action occurred early in February 1942 and just a week later the most famous 'incident' of all occurred, the Channel Dash by the German Navy major units *Scharnhorst*, *Gneisenau* and *Prinz Eugen*. Fan Bay's involvement in this was using the CD/CHL radar as a spotting tool. Further into March of 1942 again S-Boats were the target, six rounds being fired in a fifteen-minute engagement.



Volunteers clearing the rubble in one of the tunnels.

Photo Hedley Basford

The gunners would have to wait until August of that year to obtain their first 'kill.' On 16 August 1942 the battery was involved in a twenty-minute engagement with German R- (*Räumboote*) and B-Boats. A total of twenty-six rounds were fired and there was one confirmed sinking; the survivors were rescued by the Royal Navy. Various engagements continued until late 1943 when increasingly the actions were coordinated with Wanstone (Jane and Clem 15-inch) and South Foreland (4x 9.2-inch) – together this was called the Fortress. The three units were combined and became the 540th Coast Regiment Royal Artillery and this remained until the end of the war. Fan Bay with its six guns was never the biggest player but a vital part of the larger picture of defence.

The beginning of the end

Eventually the German guns at Cap Griz Nez were captured on 26 September 1944 by the Canadian 2nd Army and by now the Dover Strait was more or less under control of the Royal Navy. The guns which had been so quickly placed into service along with the herculean effort to provide the Gun Batteries in which they resided, along with living accommodation and control equipment, would fall silent. Their job had been done.

Churchill had said that "We have to fight for command of the Straits by artillery" and in doing so deny the enemy the use of the Dover Strait. In that respect Fan Bay and the other gun batteries appear to have been successful.



Tunnel after clearance of rubble and rubbish.

Photo Richard Crowhurst / Corvidae Ltd

After five long years of war, VJ day in August 1945 was celebrated across the land and Fan Bay stood down. Soon the troops would depart from the site and the battery so hastily built would fall silent, with just a local man employed to oversee the site and to deter inquisitive people from wandering around.

By the 1950s even this measure was withdrawn and the battery was sold to a local company, Bird's Commercial Motors Ltd of Dover, to clear the site and scrap the guns. The company appeared to have been fairly diligent in this respect and eventually the gun emplacements were empty of their guns, electrical cable from the whole site had been retrieved and fixtures and fittings from the barrack blocks disappeared.

The derelict site remained like this for some years – a playground for the local children playing their own war games, recreating their heroes' exploits from comics like *Victor* and *Eagle* or indeed accompanied by their fathers and being inquisitive! The Royal Marines at Deal used them as training grounds as did cadet forces from across the country. By the 1970s there was a growing campaign 'to rid the White Cliffs of the eyesores of war.' This campaign eventually bore fruit and the Fan Bay Battery was demolished. Tons of soil and chalk were deposited over the remains that could not be demolished such as the underground shelter.

By the early 80s there was nothing really to see – just a few innocuous lumps of concrete and brick, and low

down in the grass a small hole just big enough to allow a man to crawl through into the darkness below. Once inside, a difficult descent down a rubble and spoil-filled staircase holding onto a piece of rope brought you to the first landing; after that it was a fairly easy descent into the former deep shelter. Only a few made this hazardous descent.



Sub Brit Members inspect Fan Bay's excavated plant room before going underground. Photo Tim Wellburn

Renaissance

The site would remain largely forgotten until 2012 when the National Trust, after a major appeal, bought a 1.35 km stretch of the cliff top from the local farmer. Within this land lay the entrance to the Fan Bay Deep Shelter and once initial assessment and clearing had been undertaken by the Kent Underground Research Group, the National Trust recruited a small army of volunteers to bring the tunnels back to life again with the aim of opening this largest and best preserved Deep Shelter to public guided tours.

These volunteers have been working since December 2013 and in that time over thirty tons of spoil and chalk have been cleared and bagged. The roof falls from the drift tunnels have been cleared, mine engineers have replaced the wooden props in the seaward tunnel, and the volunteers themselves cleared out this tunnel to the point where it would break out into the open.



Mining engineers looking at the excavated entrance to the shelter adjacent to the 15' sound mirror. Photo Jon Barker

In October 2014 a major phase of the project commenced when commercial diggers arrived on site, first of all excavating the top entrance and plant room and then commencing to stabilise the bank before cutting their own roadway down to the lower entrances.

This phase was again supported by volunteers making sure that people using the footpath were not only kept safe, but also answering the thousands of questions that curious people asked. Most were amazed at what was directly below their feet, for some had walked the cliffs for years and had no idea of the tunnels' existence. Others admitted to playing in them as children.

The Sound Mirrors are recovered

In just three weeks a huge amount of spoil was cleared and both lower entrances, toilet blocks and the all-important Sound Mirrors were uncovered. Breakthrough of the seaward tunnel occurred during this phase of the operation; however the landward tunnel would prove a little more obstinate and that would necessitate a visit from the mine engineers who opened the tunnel in February 2015.

Their work could not have taken place, however, without the sterling help of the volunteers who for the second time manhandled 96 very large railway sleepers down the 125 steps into the tunnel. It could be said that the project manager is a hard taskmaster!

As well as opening up the Fan Bay Deep Shelter and adding a major tourist attraction to the National Trust's portfolio there was to be a jewel in the crown, or more precisely two jewels: these are the Sound Mirrors.

Sound Mirrors – or Acoustic Listening Devices – came about from research work that started in the First World War by Dr William S. Tucker (1877–1955) who enlisted in 1914 as a Sapper in the Royal Engineers and finished the war as a Major. During the war he invented a special microphone that was named after him and was used extensively on all fronts for Gun Sound Ranging. After the war he was appointed Experimental Officer at the Signals Experimental Establishment.



Sub Brit Members take shelter. Photo Tim Wellburn

During the war Tucker, along with other eminent scientists, experimented with ways in which sound could

be detected and made audible long before it was audible to the human ear. From this research sound mirrors were born. True to say that experiments had been made just before the outbreak of war but it would be the war that would spur on this research.



*Fan Bay entrance stairs; until the entrance by the sound mirror was reopened, this was the only way into the shelter. Original ventilation trunking is still in place.
Photo Tim Wellburn*



Until recently the entrance at the top of the stairs was the only way in to the shelter

At Fan Bay there are two mirrors and from documentary evidence the landward one can be dated to the First World War. Originally this mirror was cut from the hillside and the surface covered in ‘puddled’ chalk; however experiments found that this surface was not effective and the surface was later covered in concrete. Today, looking

at the concrete one can only marvel at the smoothness and exactness of the structure.

The First War mirror is a fixed 15-foot-diameter mirror and as originally constructed would have had a listening device located about nine feet six inches in front of the focal point. This is evident today as we can actually stand at that point and the intensity and amplitude of the human voice changes. The listening device would have been initially a trumpet and an operator would have stood on a pedestal listening to the reflected sound via a stethoscope. Skilled operators were said to be able to tell the difference between single and multi-engine aircraft and also could tell the rate and direction of turn by the use of Doppler Effect. On quiet still days, ranges in excess of fifteen miles could be expected but all mirrors suffered from background noise and at Fan Bay that is quite evident. Even on nice calm summer days the noise of the sea against the cliffs is quite noticeable.



*Original ventilation trunking still in place at the bottom of the entrance stairs. Photo Richard Crowhurst / Corvidae Ltd
First World War success*

However the Fan Bay mirror was effective and first used on the night of 1 October 1917, successfully picking up the sound of enemy aircraft at 12–15 miles. At that time the sound was inaudible to the Dover Gun Crews. The aircraft were on their way to bomb Boulogne and during the raid the ‘sound of the raid was unbearable’ to the Fan Bay Operators. The Fan Bay mirror worked in conjunction with a mirror located at Joss Bay, North Foreland and the resultant information was used to produce a plot of the raid position and movement.

The mirrors were instrumental during the night of 19 May 1918 when a huge bombing raid was launched on London and aerodromes in Kent utilising 38 Gothas and 3 Giants. Eighty-eight fighters attempted to intercept them with some success. Lt Col W. M. Thompson, the Dover Anti-Aircraft Defence Commander, stated that the reflectors at Fan Bay and Joss Bay proved invaluable in picking up the position of the enemy aircraft five to ten minutes in advance of the first warnings received at the gun stations.

The second mirror at Fan Bay dates from the 1920s but few if any records remain to give us any precise

information as to the building and use, although the fact that it was between the wars would indicate that its use was purely experimental.

Back to the present day, both mirrors are in excellent condition and a long-term conservation plan is being worked on to save these hugely important and iconic structures. The project remains on course to open the Fan Bay Deep Shelter to the public facilitating a hard hat and head-torch tour of the complex and also to allow them to see close-up the Sound Mirrors. The tour is intended to be a raw experience and without visual aids and recreations – instead it is to allow the tour guides, again volunteers, to bring the tunnels to life and hopefully provide the visitors with a richly rewarding visit.

Sub Brit visit

To the Lighthouse! As warned in Chris's notes, this was less easily found, at least from the landward side, than might have been imagined. However, it emerged from the trees just as we were contemplating 'Plan B', its white paint gleaming in the afternoon sunshine.

Preserved by the National Trust (and open to the public from approximately April to October), it is historically important as the first lighthouse in the world to display an electric light. A second, disused light lies on private land (large notices make this fact very clear!), a short distance away to the east. This was originally built to provide ships with a pair of marks to enable them to avoid the Goodwin Sands, but was abandoned when the latter shifted position.

We started the visit with a short briefing by Jon Barker, a Sub Brit member, who works for the National Trust White Cliffs Project and is the driving force behind Fan Bay's renaissance. After Jon had introduced the site and updated us on recent progress, we strode out across the headland – which must indeed be a bleak place in foul weather. Fan Bay was the site of a Second World War battery of three six-inch guns. Constructed between 1940–41, it was manned by 203 Coast Battery, Royal Artillery.

The guns were supported by the usual infrastructure of magazines, shelters, plotting room, administration and accommodation areas. Little surface evidence of all this now remains as the Ministry of Supply sold the site for scrap in the 1950s, and in the 1970s the local council later bulldozed what remained, regarding it as unsightly. However, for Sub Brit, the particular fascination of the site is the Battery's deep shelter tunnel system. This was dug by No.172 Tunnelling Company, Royal Engineers, to accommodate the Battery's four officers and 185 other ranks. And it is this which Jon and his band of hardy volunteers have been toiling to recover from years of entombment. What they have achieved is remarkable.

Access to the deep shelter is from the largely demolished, but now painstakingly excavated, Plant Room. Three consecutive flights of stairs, turning

through two right-angles, open onto a grid plan of tunnelled accommodation spaces. Original ventilation trunking leads down the staircase from the remains of the fan in the Plant Room. In places within the shelter where the original trunking is no longer extant, it is being reinstated, using similar, new trunking procured from the original supplier!

Some of the original electrical conduits and light fittings survived the scrap man too. However, an ill-advised attempt to remove a section of the tunnel's steel hoops was rapidly abandoned as the no-longer supported backfill promptly responded to gravity. This short section is now barred off, although still visible as a warning against greed or fecklessness.



Tunnel construction techniques: removal of steelwork is ill-advised! Photo Tim Wellburn

From the southern extremities of the shelter rooms, passages lead to two parallel tunnels, both of which originally emerged further down the cliff face (the more easterly one has yet to be opened up right through). Unlike the stairs and accommodation tunnels, which are supported by steel rings and lined with corrugated iron sheeting, these smaller-bore tunnels through the chalk are unlined, although the western one is supported by wooden props. Various items of wartime graffiti have been discovered and, rather more creatively, a head carved in the chalk of the tunnel wall.

Emerging onto the cliff slope, we gazed in some awe at two long-buried Sound Mirrors which the restoration team have carefully excavated from the overburden.



These are rare structures, the more so as both are built into the cliff, rather than being free-standing (one of the latter type can be found a little further along the coast at Abbots Cliff). They are in a remarkable state of preservation.

The smaller of the two (approximately 15ft in diameter) was built in 1917 and was used operationally during the Great War. It must have been a cold duty, perched above the Channel, trying to establish the path of incoming Gothas and Zeppelins from the eavesdropped Doppler effect generated by their aero engines. The larger Mirror (approx 20 ft diameter) dates from the 1920s. More prosaically, the Royal Engineers appear to have used them to conceal the shelter entrances – and as a good location for lavatory blocks: one ‘officers for the use of’; the other for all 185 ‘other ranks’.

A lateral track in front of the Sound Mirrors marks the site of the narrow-gauge construction tramway used for tipping the excavated spoil over the cliff – the remains of a points lever can be found by those with sufficient interest and patience! Backtracking through the tunnels and up the stairs, we returned to surface and cliff top, to express our awe, and appreciation for the visit, to our encyclopaedic guide.

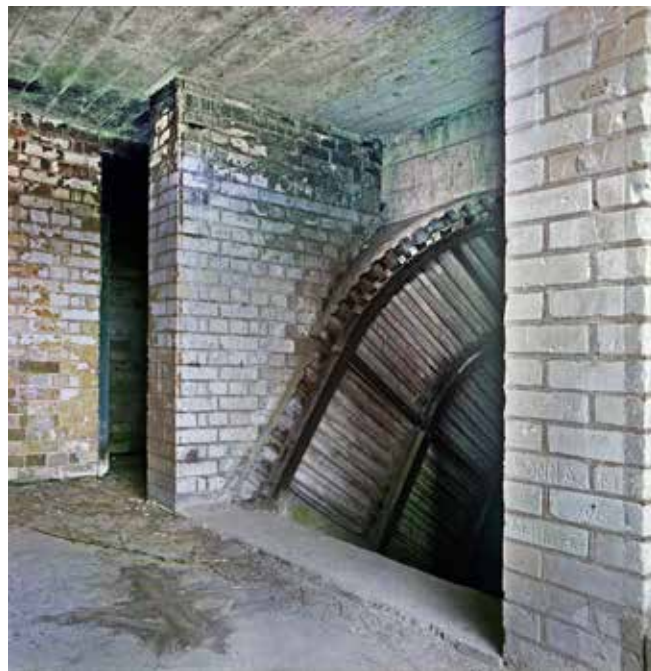
South Foreland Battery

While this marked the end of the day’s formal visits, there was just time (and light) enough for a brisk look at the adjacent South Foreland Gun Battery. The remains of this, now largely buried in scrub and woodland, lie just to the north of the lighthouse.



Stairs down to the South Foreland battery shelter - compare with Fan Bay! Photo by Tim Wellburn

This Battery had been a larger and more extensive work than that at Fan Bay, mounting four 9.2-inch guns of 290 Coast Defence Battery, as well as accommodating the 540 Coast Defence Regiment’s headquarters. The most notable action in which these guns fired in anger was the ‘Channel Dash’ of the Kriegsmarine capital ships *Scharnhorst*, *Gneisenau* and *Prinz Eugen*, on 12 February 1942. Lacking visual contact in the poor visibility, the South Foreland guns fired 33 rounds using



When visited by Sub Brit during the 1985 study weekend the entrance to the shelter was inside one of the buildings. The building was subsequently demolished and the entrance buried. It has now ben dug open. Photo Nick Catford

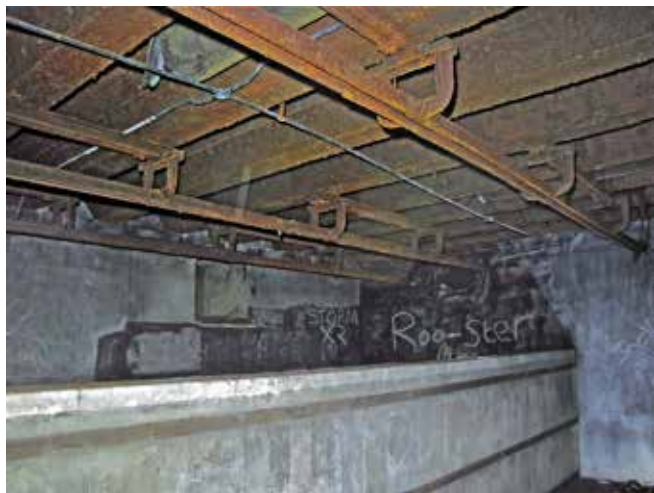
radar plotting of the ships, but secured no hits.

Nos. 1 & 4 Guns had their own underground magazines, each linked to its gun pit by a subterranean passage (as with the guns at Fan Bay). However, nos. 2 & 3 Guns were served by a pair of above ground magazines, buried under a huge earthen mound and accessed by a large common entrance passageway – the changed method of construction perhaps being adopted for reasons of speed or economy?

There were also separate Battery and Fortress deep shelters, as well as all the usual ancillary buildings. With the aid of a plan (and some perseverance), we found and inspected about half of the surface remains – with the curious exception of the gun emplacements, which we never found. However, we did locate their magazines as well as the entrance to the Fortress shelter and the Fortress and Battery plotting rooms.



Entrance to No.1 gun magazine. Photo Clive Penfold



Shell transporter rails in the shell store,
Nos. 2 & 3 guns magazine. Photo Clive Penfold

The underground structures have mostly been secured by Kent Underground Research Group, to protect them from further vandalism. The exception is the nos. 2 & 3 Guns magazine, access to which is completely open and,

Peter Jigins

1941 - 2004

Martin Dixon



We were saddened to hear that Peter Jigins died on 5 January of this year. Peter had been a Sub Brit member for many years and until illness intervened was a regular attendee at events and visits, often accompanied by his wife Sheila who herself died two

years ago. Although his illness was long, his personality remained strong and he died peacefully at a local hospice. He was lovingly cared for in the months before his death by Valerie Audus – a friend of both Peter and Sheila for over 45 years.

After leaving school, Peter trained as an engineer with Ilford Films but later satisfied his life goal of joining the police force, serving with Essex Police. He retired as a Sergeant and his police hat was borne on the coffin at his funeral. Peter's real passion was railways and he was a dedicated and skilled modeller, with a particular interest in European layouts. He was a great traveller and a frequent visitor to Germany in particular having made many good friends there.

Peter always had a smile on his face and as well as being an occasional contributor to *Subterranea*, also wrote many articles for railway modelling magazines.

to our surprise, in one chamber still retained the overhead shell transportation rails. A fine subterranean finish to an excellent day!

Our sincere thanks are due to Chris Rayner for organising a fascinating series of visits, and to our hosts, Kane Guy and Phil Spain at the Ramsgate Tunnels Project, and to Jon Barker and the National Trust team at Fan Bay.

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Ramsgate Tunnel Railways

en.wikipedia.org/wiki/Tunnel_Railway

Catford, Nick, 2005, *The Ramsgate Tunnels: Mainline Public Air Raid Shelter & Scenic Railway*, Michaels Bookshop

Fan Bay Battery

sussexhistoryforum.co.uk/index.php?topic=435.0

Fan Bay Sound Mirrors

www.andrewgrantham.co.uk/soundmirrors/locations/dover/

www.nationaltrust.org.uk/white-cliffs-dover/history/article-1355858509973/

Bringing his two interests – railways and underground space – together, we are delighted to republish this splendid article from April 1997 about modelling the German U-Bahn system. Thanks are due to *Continental Modeller* for their generous permission in allowing us to reprint the feature.

Under the weather – the U-Bahn reaches Buggleskelly

Peter Jigins

April is the ideal time to start building this kind of extension to a garden layout so that the work can be completed in time for the next closed season of winter weather.

With the advent of winter there is natural tendency for those with garden railways to remain indoors until the arrival of the warmer spring days. Probably the main reason for this is the effort needed to clean the track before each running session, and the removal of leaves, etc. Buggleskelly is no exception, and in an attempt to keep the staff occupied over the winter months it was decided to install a German-style U-Bahn or underground system.

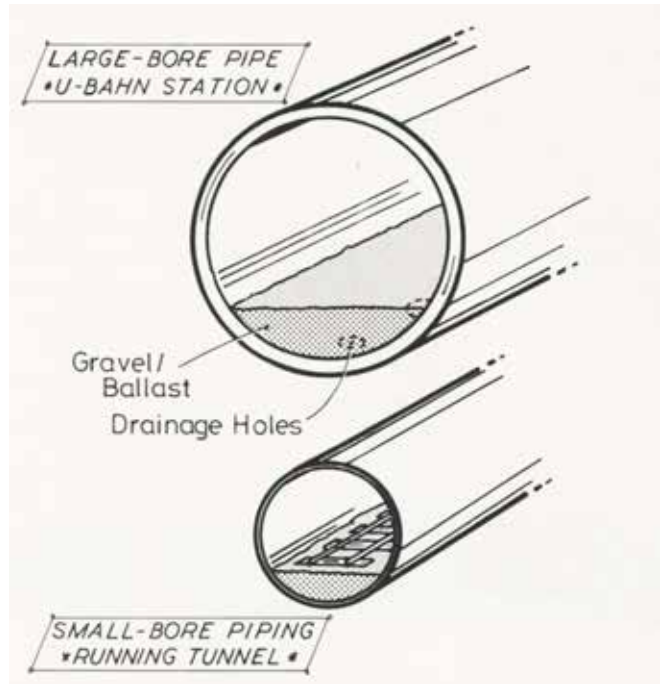
The advantages of having the track underground are immediately obvious as there is no longer a problem with leaves on the line or snow on the ground in winter. These hazards have usually abated by the beginning of April, but in the summer there is the further benefit of not having to manoeuvre the lawnmower carefully around the track.

The track plan has been kept simple, consisting of one continuous single track circuit with passing loop tracks at the stations. The tunnel for the main running track consists of PVC soil pipe, with larger bore pipe used

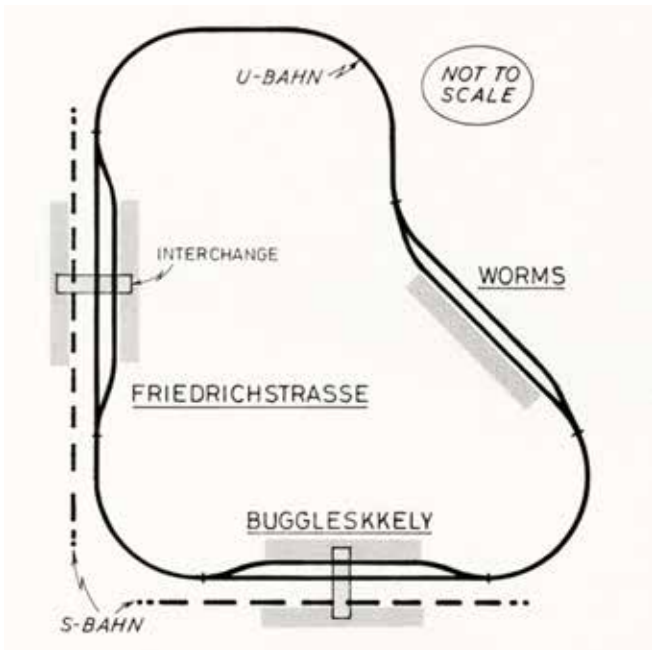




Both types of pipe before installation

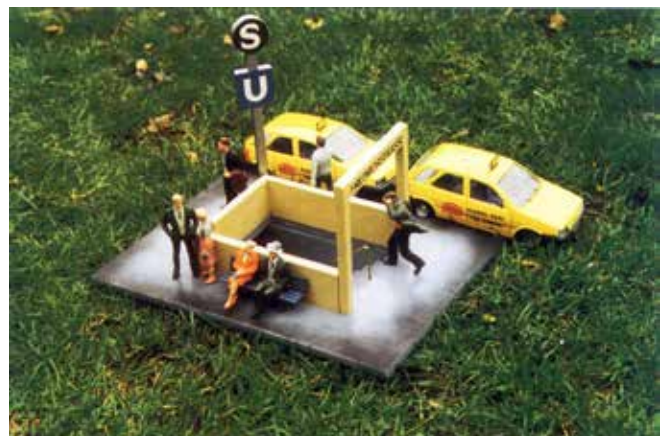


Questions often asked are: “Don’t the tunnels flood when it rains?” Of course not – drainage holes have been drilled into the bottom of the running tunnels. “What if mice get into the tunnels?” The first train of the day will usually flush them out. Invariably they will run around in front of the loco until tired and then exit at the next station. “What happens if the train derailed?” This has never happened. The clearance between the tunnel and rolling stock is such that there is insufficient room for the vehicles to jump off the track. “Where do you get the large scale U-Bahn stock?” For the moment I am using standard G scale stock, but I have considered scratch building using PVCu, as I did for the structures, or the LCE train from LGBTM might make a good basis for conversion. But unless you peer down the steps at a station you can’t see what’s going around down there anyway! “How do you know where the train is at any time?” The tunnels are sunk only about 5cms into the ground so by putting your ear to the lawn you can hear where the train is. This is where it helps to have a club meeting so that various members can be situated around the garden with their ears to the ground, each one shouting out as they hear the train approaching.



for the double track at the stations. There are only three stations on the line: at Buggleskelly and Friedrichstrasse, where there is a direct connection to the S-Bahn (normal garden railway); the other is at Worms.

Access for passengers is via steps, based on a typical German city U-Bahn station entrance, constructed from PVCu sheet. A PVC flap (manhole) provides access in order to place rolling stock on the track.



One of the U-Bahn station entrances

Clapham South Deep Shelter

Sub Brit Visit – 5 February 2015

Chris Howells



Many of the original bunks are still in place, making ideal shelves for archive boxes in recent years. The original cross bunks are seen on the right while the blue units on the left are more recent and replaced the longitudinal bunks

Early in January I was excited to receive an email informing us that a Sub Brit visit to Clapham South Deep Shelter had been arranged and that a few lucky members would be able to go on the trip. Disused tube stations are extremely interesting to me and are one of the things that got me interested in underground places in the first place. Sadly though, apart from the odd trip to Aldwych, they remained ever elusive as my interest unfortunately started shortly after 7 July 2005 – the events of which made it somewhat harder to tour disused London Transport property.

The lucky members would be able to register their interest by accessing **mySubBrit** from 0900 one Sunday morning. Having set my alarm clock unusually early (in fact, at all) for a Sunday, to access the website at the prescribed time, I was delighted to find out that I was one of the lucky twelve to register for the trip. It turned out that demand was so high that the website almost went into meltdown; apparently a ballot may be used for similar events in the future as was done for Brompton Road.

Site background

During World War II, eight deep-level air-raid shelters were built beneath existing tube stations, mainly on the Northern line. Each shelter took the form of two parallel tunnels aligned with but well beneath the existing tube lines. Each tunnel is around 440 yards long and has two levels of shelter, making a total 'shelter length' of around a mile. The shelter was completed in 1942 but only opened to the public with the start of the 'V-weapon' attacks in June 1944. Other shelters found alternative wartime uses including use as communications centres, for troop accommodation and for various cloak and dagger organisations.

The plan had been to link up these tunnels postwar and use them as part of a new express tube line to address overcrowding on the Northern line. This never happened but Clapham South in particular continued to be used up to the early 1950s as a hostel for immigrants, for visitors to the Festival of Britain (1951) and as accommodation for Royal occasions such as George VI's funeral (1952). For more on the history of the shelters, see the Sub Brit



website or one of the excellent publications listed at the end of this article.



The north entrance on the corner of Clapham Common, opposite Clapham South tube station. The green interpretation installed by Lambeth Council, in co-operation with Sub Brit is prominent. Photo Konstantin Binder

Meeting Up.....

On the day of the visit, a very cold January day, the full party of twelve Sub Britters excitedly congregated in the entrance of Clapham South station whilst our extremely knowledgeable and interesting guide Chris Nix and other London Transport Museum staff and escorts also arrived. We were very glad when the warmth emanating from the tube station below occasionally won its battle with the bitter outside cold to make us feel a little more comfortable, but not to worry, we'd be underground soon. It was good to see a few familiar faces but for some it was their first Sub Brit visit.

An occasional but regular beep from Chris's gas detector punctuated the air, but not to cause any annoyance. Although this visit was actually pretty tame compared to some of the disused mines and bunkers that I've crawled into (walk-in and not getting filthy is a luxury), it seemed a sensible idea to reassure the general public who may be allowed to visit the site in the future. And it was actually slightly reassuring to know that we would not be suddenly be overcome by a large pocket of hydrogen sulphide, regardless of how unlikely a pool of water and a large pile of rotting organic matter may be in a disused tube station!

Our first stop was just across the road from Clapham South Station, the concrete and brick structure which forms the north entrance to the shelter, one of two, in the grounds of Clapham Common, adjacent to the main road. We admired this from the outside whilst inspecting the interpretation board which has been installed by Lambeth Council, in co-operation with Sub Brit, to inform the busy commuters who rush past what this unusual and not (to most eyes) especially attractive structure on the edge of the park is. The sign includes a scannable bar code that takes smart phone users direct to the Sub Brit website.

The cylindrical structure does not exactly match its WWII appearance - there was previously additional ventilation trunking, although this was removed in the

decade after the end of the war, to improve its appearance. The Common had also been used during construction to store the spoil from the construction of the hand-dug tunnels which presumably made for an interesting aerial view of the site to any curious Luftwaffe pilots.



Our access to the shelter was through the south entrance. Ipsus Developments acquired the south entrance which included the administrative offices for all the shelters and the ticket printing works in June 2010. This is the interpretation panel placed on the refurbished building by Ipsus

This entrance would not be our way into the shelter however, although we would later view it from the inside. We walked down the road (Balham Hill) towards the south entrance, now known as "The Drum"; in doing so we had passed into Wandsworth as the shelter straddles the two London Boroughs. Although once identical, the surface building now has a quite different appearance to the entrance on the Common. The land it lies on was disused for many years, it has now been clad with white tiles and tastefully incorporated into a modern building known as Ipsus07, a residential development, construction of which started in 2011. There is another interpretation board here and the structure has its own website, which can be found at ww2drum.com.

.....and Going Down.....

Inside the entrance building there is a lift, unfortunately disused for many years due to lack of servicing, and a double helical staircase – not unlike the structure of DNA. The two staircases terminate on the two

separate floors of the shelter which cleverly minimised congestion at the bottom of the stairs. At present the second staircase is floored over at the surface but still accessible by a trapdoor.



The top lift landing. The lift was still working when the shelter was vacated by Security Archives but having been out of use for 10 years we had to walk just as the shelterers had to walk during the war.



It's 200 steps down and 200 steps up again

We climbed down the some 200 steps to the bottom of the shelter and assembled. We were immediately impressed about how many original WWII signs were still extant, some on the floor, but many in their original place on the wall. Each level of each tunnel was split into four separate 'sub-shelters' with an alphabetic designator. To make things easy all the areas within the shelter were actually named after a naval commander, so shelterers would follow signs to 'Drake' or 'Nelson' rather than just D or N. This was probably to make direction-finding as easy as possible but as each complex had its own themed names it often allows the location of contemporary photos to be identified.

As you would expect, the tunnels are constructed in typical London Underground fashion with LPTB (London Passenger Transport Board) marked on the varying diameter tubes. The two large parallel tunnels, which would have formed the running tunnels for the extension of the Northern line, were built to a sixteen foot six inch diameter. Although wider than normal running tunnels of twelve feet, there was no intention to run larger stock but calculations showed that 16' 6"

was the smallest practical diameter to accommodate a two-level shelter. The main tunnels are augmented by a number of auxiliary tubes of smaller diameter which form other functions such as connections between the two large tunnels, space for equipment, or communal facilities such as toilets. Inside, contractors had been busy recently installing new lighting and evidence of their work occasionally littered the floor. The shelter was lit throughout.



Each tunnel was divided into 4 sections with connecting doors between them. Each section was given a name. At Clapham South they were all naval commanders. The northern entrance sections (i.e. those accessed directly from the northern lift without crossing to the other side) were named: Fremantle, Beatty, Evans, Anson, Nelson, Jellicoe, Madden and Inglefield while those accessed from the southern entrance were: Grenville, Hardy, Drake, Oldham, Keppel, Parry and Ley. Many of the signs are still in place throughout the shelter. Photo Konstantin Binder

....But Not Out

We made our way to the northern end of the shelter walking on both levels of one of the main tunnels. The tunnels are generally in very good condition, with no sign of damp. We observed more signs and ventilation ducting on our way and passed huge numbers of original bunks (see later) and more recent racking, installed when the site was used for document storage.



Even the stairs leading to Clapham South station platforms were used for storage in recent years.

At the mid-point of the shelter we viewed the flight of stairs which connected the tunnels to the tube station; these are covered with modern empty shelving which

somewhat obscures the view and makes navigating the stairs hard. Unfortunately the size of the group precluded exploring these stairs and viewing the bricked up entrance to the tube station. Apparently this third entrance to the shelters was little-used but would certainly have helped the shelter serve more than its immediate neighbourhood. We didn't see any signs to the tube station exit, suggesting that even if it was used as an entrance, shelterers would all leave by the main shafts.

When we arrived at the northern entrance to the surface, it was time to tackle more stairs, and we climbed up to view the interior of the structure that we had initially viewed from the outside at the start of our trip. We walked around the circular landing at street level, where we could see more clearly the original entrance which split into two in front of a hatch used (presumably) for ticket inspection. Having caught our breath we descended back down to the shelter via the other spiral staircase. 600 steps and still going strong

Furniture and Fittings

As well as modern shelving, most of the original three-level bunk beds have also been converted into shelves by laying a piece of wood over the springs. It's great to see that thankfully these were reused for their new storage purpose rather than being removed and scrapped. Some of the bunks run across the tunnel and others are aligned along the length of it.

To maximise the available space, and reflecting the fact that they're installed in a circular tube, the bottom layer of the 'sideways' bunks is shorter than the other two, so not suitable for tall persons. What was fascinating was that it was still possible to see the original numbering of the bunks, despite the passage of years and their reuse. Many of the bunks (especially those near the entrances) had designated users such as 'Fire Warden'. As the whole shelter (and in fact the active tube station) is grade II listed then these features should be preserved for everyone's benefit.



Our knowledgeable guide Chris Nix relating the history of the shelter to an attentive audience

From the lower half of the tunnel it was easier to understand the construction of the shelter by seeing the way that the floor had been installed at half-height in

the tunnel. Somewhat haphazardly, it appeared, under wartime conditions and in the days before computers and modern construction techniques have allowed greater precision, but it seems to have successfully stood the test of time.

A few electrical fixtures and fittings remain including a fuse box labelled "Buffet Fuse Brd", which gives a clue to the purpose of the area whilst the shelter was in operation. Looking down the length of the running tunnels makes it easy to observe their gentle curvature. Even without the intermediate doors, it would not be possible to see from one end of the shelter to the other.



The north end of the upper level. From here stairs lead down to a cross passage to the parallel tunnel or to further stairs to the lower level



This way to the control room



The shelter warden in the control room

Southbound

We next headed back via the other parallel tunnel to the southern end of the site, taking in the various points of special interest on the way. We saw a variety of graffiti from some of the previous users of the shelter. This all seemed to be postwar and included some undated military ranks, a Cyrillic name and an unexpected 'Brix von Bremen' dated 1949. We also saw the second landing of the stairs linking the shelter to the underground station but once again it was hard to make out anything other than the modern storage shelves.

A room marked as the "Control Room" contains a wooden panel which previously housed what look like fire prevention/detection instruments, but these have been removed and the rest of the room is quite bare. Interestingly, two of the spaces on the panel are marked 'No 9 Shaft Balham Hill' and 'No 10 Shaft Clapham Common'. These are clearly the main access shafts but it is intriguing to see them numbered 9 and 10. One implication is that the shafts in all the shelters were uniquely numbered – perhaps to help with central monitoring or emergency services.

We were able to view other ancillary rooms including a medical aid post, one of the few clues to its purpose being a small tiled area with a tap attached to it. We also saw a smaller warden's post, which like the medical room ran as a short cul-de-sac tunnel near the entrance shafts. We also observed the mains (water and power) supplies and raised floor of one of the 'canteens' as the refreshment stations seem to have been called. In wartime, apparently, only catering supplies were of a high enough priority to make use of the small lifts down the centre of the access shafts.



We were able to visit the southern plant room which is at a lower level close to the bottom of the lift . When the museum runs public tours which will begin later in the year this area will not be included

The final special purpose room we saw were two labelled for 'recreation' each within one of the cross-passages linking the two main tunnels. Given their size, snooker, table tennis and even darts would have been out as there only appeared to be space for cribbage or dominos.

Towards the end of the tour we visited one of the lower parts of the shelter, the sump, which is underneath the ventilation shaft and still contains assorted plant and machinery. Access is via a spiral staircase leading onwards from the lower lift platform. Drainage pipes



The most impressive feature of the plant room is the mercury vapour rectifier which is original and was still in use until the lift was taken out of use. The mains transformer that fed the rectifier is in the cabinet to the left. The cabinets on the right contain rheostats for controlling the speed of the fan

can be followed emptying into a large sump which was emptied using an ejector pump to surface drainage but looked large enough to have kept the shelter and facilities operational in the event of plant failure. There was also a large fresh-water tank still in situ.

There is some rather beautiful original electrical switch gear, which appears to be in excellent condition, which must presumably have been the equipment to power the ventilation equipment and lift. It was a delight to see a mercury arc rectifier still intact in its original location, although unfortunately not still in use. Looking up, it's possible to see into the vent shaft through the blades of the ventilation fan.

According to a plan of the shelter the northern end of the site would have mirrored this equipment, although that must remain a mystery for the moment, as despite having over two hours underground and walking at a fair pace, there was still not enough time to see every area of the extensive shelter in detail.

Our last stop before heading back to the surface was to visit the nearby lavatories. These were built near the entrance shaft and, more importantly, near the drainage sump which minimised pipework. Each level had two male and two female blocks, so each block would have

served the needs of 1,000 people (as the revised capacity of the shelters was to be 8,000 people). Assuming, of course, an equal mix of the sexes.... Although the sanitary wear has been removed it's still possible to see from the outlines on the walls and floors where the urinals and toilet cubicles would have been fitted.

The Future

The future for the site looks very positive. As well as having protected status, the London Transport Museum (working with TfL) plans to open the site for public tours in much the same way as they do at Aldwych. Some of the more recent storage racking will probably be removed and a small amount of 'dressing' of some of the areas is being considered. This is no doubt especially good news to those who were unlucky in securing places on this special advance visit – although some of the areas that Sub Brit visited may be 'off-limits' to the public tours. As at Aldwych (where Richard West does the honours) we may well be able to arrange future special Sub Brit tours alongside the public programme. Sincere thanks to Martin Dixon for arranging the visit and to Chris Nix and the LT Museum for hosting Sub Brit. It was great to see an important site in such a fine state of preservation and I hope many others will be able to follow in our footsteps.

Photos Chris Howells unless stated



Most of the surviving bunks are on the lower level, much of the upper level has been stripped of bunks and shelving.

Photo Konstantin Binder

References

Nick Catford *Secret Underground London* (Folly Books, Monkton Farleigh 2013) ISBN: 978-0956440570
Martin Dixon *London's Deep-Level Shelters: Britain at War* (Key Publishing July 2014) ISSN 1753-3090
Andy Emmerson and Tony Bear. *London's Secret Tubes* (Capital Transport Publishing St Leonards on Sea 2004) ISBN: 978-1854143112

The County Borough of Croydon's air-raid shelters in World War II

The County Borough of Croydon (now part of the London Borough of the same name) had a population recorded in the 1931 census of 233,032 (there was no census in 1941). In 1949 the Borough published an impressive and detailed history of the war years. This records the public air-raid shelter programme (but does not deal with commercial firms' shelters, individuals' DIY shelters in their cellars or gardens, or Anderson or Morrison shelters).

The Borough Engineer, Charles Eric Boast [1892 – 1962], oversaw the creation of covered trench shelters, protected basements, and built surface shelters. At Fairfield (before the war an open former gravel pit containing extensive railway sidings), the present location of Croydon College, the Fairfield Halls, and a roofed-over car park, several shelters were constructed from concrete drainage pipes six feet in diameter. These could accommodate 800 persons. Built surface shelters were erected with capacities ranging from 50 to 350 persons. These were subsequently fitted with bunks when it became clear that night raids would be sustained. Collectively they had night accommodation for 8,736 people. There were also 129 public basement shelters, of which seven were open only during shopping hours, with spaces for 12,330. Twenty-two of these were provided with bunks to sleep 5,090. The largest, for 500, was in the basement of Electric House in Wellesley Road (still standing), then the headquarters of the Corporation's electricity generation and supply department (it was

nationalised in 1948, and privatised in more recent times), and is now occupied by the Home Office.

Trench shelters, mostly in public parks, had spaces for 2,810, but were unpopular as they became waterlogged in wet weather.

Croydon has a claim to have inspired the Anderson shelter, which was distributed nationally by the Ministry of Home Security to 29,650 private homes by the winter of 1941. The Borough's Air Raid Precautions Committee had, before nationwide manufacture and delivery had commenced, independently debated the practicalities of 'some sort of shelter, sunk or partly sunk, in the garden'. Anderson shelters were of galvanised corrugated iron sections bolted together in a hole in the garden and earthed over. The recommended depth of hole was two feet six inches, and the earth cover was to be fifteen inches thick over the arched top, and thirty inches around the sides. These shelters were blast- and splinter-proof, but unpopular as they, like the trench shelters, easily became waterlogged: 13,700 had to be concreted. They were free to householders with an income of £ 250 p.a. or less. Morrison 'table shelters' to be constructed inside homes were also distributed from 1941. Your scribe (PWS) slept in a 'Morrison' during the war!

SOURCE: SAYERS, W.C. Berwick (edr), 1949, *Croydon and the Second World War*. Croydon Corporation: xx + 581pp + folded map showing locations of flying bomb incidents.



A Visit to Guernsey

Paul W. Sowan



The southern access tunnel at Ho 1 is now used as a workshop by Festung Guernsey for the restoration of large and small items left behind by the Germans

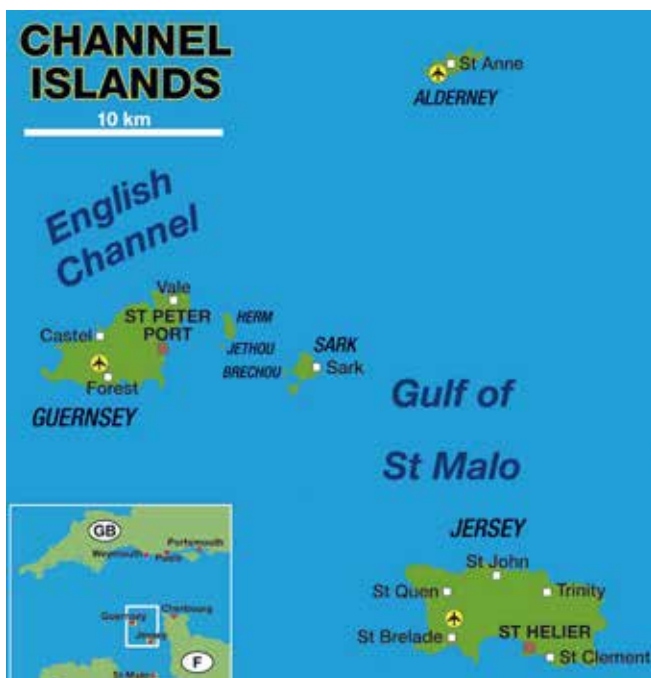
The Channel Islands are not part of the United Kingdom, but are a ‘Crown Dependency’ and owe allegiance to the Queen. The Bailiwicks of Guernsey and of Jersey are constitutionally independent of each other, each regarding

the other, in effect, as a foreign country. They have their own currency notes and postage stamps, the latter at least not being interchangeable.

Jersey, along with a few small or even uninhabited islands, is the largest of the Channel Islands. Guernsey (along with Alderney, Sark, and some even smaller islands) is the smaller island and Bailiwick. The islands were the only part of the British Isles to be invaded and occupied by Germany during the Second World War.

All the islands lie off the coasts of Brittany and the Cotentin peninsula of Normandy, much closer to France than to England. On a clear day, the Cotentin coast and all the other larger islands can be seen from Jerbourg, an elevated promontory at the southeast extremity of Guernsey. Jersey lies 28 km to the southeast; Sark is 13.7 km away to the east, with the French coast another 30 km beyond it; while Alderney, closest to England, is 30 km to the northeast. Beyond Alderney, it is another 70 km to the south coast of England.

From time to time massive defences have been erected and tunnelled around the islands’ coasts, especially during the Victorian era and by the Germans during their period of occupation during World War II.



Description of Guernsey

The coastlines of all the three largest islands consist in part of high rocky cliff lines which constitute natural defences against invasion. All of them, too, are surrounded by numerous offshore rocks, some of which are exposed only at low tide, making approaches from the sea hazardous other than at St Samson and St Peter Port (Guernsey), St Helier (Jersey) and Bray Harbour (Alderney). Guernsey is roughly triangular, the 11.5 km long south coast being an upland area protected by steep and rugged cliffs. It is on this high plateau of, predominantly, crystalline metamorphic rocks that the airport is situated.

St Peter Port with St Samson, halfway along the east coast, is the only town. Smaller settlements are scattered around the island. There was once a public passenger tramway connecting those places. This was extended along the northern and northwestern coasts and developed during the German occupation for mineral traffic, predominantly sand and crushed rock for making concrete.

Geology and natural resources

All the islands are also alike in their geology. There is no limestone, so the manufacture of cement and concrete demands importation from France. There is no coal, gas or oil, so all fuel has to be brought in, for whatever purpose, including cement manufacture. These factors rendered the German defences exceptionally expensive undertakings. Fresh-water supplies, also needed in quantity for concrete making, verge on problematic. There are at least some deposits of clay on Guernsey which have been used for brick and tile making, and all the larger islands have relatively copious supplies of sand and gravel.

What the islands have in abundance is hard rock, much of it eminently suitable for building-stone and for aggregate for concrete. The two great periods of fortifications building, the Victorian era and the Second World War, drew on these hard rocks, most of which are technically speaking not granite, although they are often popularly known as such by non-geologists. More or less roughly squared 'granite' is seen in buildings throughout the island, whereas reinforced concrete structures incorporate the same material as aggregate alongside the cement binder. Considerable amounts of 'granite' were exported to England from the three largest islands in the nineteenth century, over 120,000 tonnes in 1858 for example.

The most important economic resources, before tourism came to be the islands' most important source of income, were agriculture, especially dairy farming and the cultivation of flowers, potatoes and tomatoes.

Engineering geology

From the military engineering point of view, the hard crystalline rocks have been a mixed blessing, as individual rock masses can be unpredictably very variable in quality over short distances. And of course the hardest rock is expensive to drill and blast, and also to crush and grade for aggregate for making concrete. Tunnelling into

fractured and crumbly zones of otherwise sound rock led to many subterranean military works being abandoned part-completed, and to others partially collapsing in the postwar years.

Hitler's Organization Todt and its staff tasked with effecting a workable occupation and defences would have known the islands' resource limitations in advance. For example, a description of the geology of the four main islands, written by one John Parkinson, had been published in Heidelberg in 1917, being an appendix to the British Isles volume of the *Handbuch der Regionalen Geologie* edited by Professors Steinmann of Bonn and Wilcken of Strassburg.



Approaching the command post of Batterie Generaloberst Dollmann on the cliff top overlooking Gull Rock. This is a distinctive two-level semi-sunken bunker with a square roof raised on pillars above the rangefinder position. This was used by Guernsey Civil Defence as a nuclear monitoring post until the 1980s when it was abandoned following persistent vandalism and a new post was opened in one of the island's four telephone network junction bunkers nearby at Torteval

Fortifications and tunnels

Curiously, despite Guernsey being much larger than Alderney (where there are three or four massive Victorian forts alongside smaller ones), there is relatively little in the way of massive nineteenth-century and earlier military building. But German concrete structures, often with sub-surface parts, abound. Rock-cut and, where rock conditions dictated, concrete-lined German storage tunnels are numerous. German tunnels on the Channel Islands were known as Hohlgangsanlage which can be translated as 'cave passage installations' and each is given an identifying number (Ho 1, Ho 2 etc). The Germans intended these tunnels to protect troops and equipment from aerial bombing and to act as fortifications in their own right. The Channel Island tunnels are the only ones on the Atlantic Wall to be referred to as Hohlganganlagen.

After the War ended

After the Normandy Landings of 1944, Germany lost control of vital shipping routes from France to the Channel Islands, and their occupying forces were unable to rely on supplies from St Malo or other French ports. Huge quantities of military equipment and materials

littered the landscape. Some was recycled as scrap iron. Some was dumped at sea. And a great quantity was stowed in the numerous abandoned military tunnels, where some of it can still be seen. Many of the tunnels were sealed and effectively forgotten about for a generation.

Ownership of German military sites was restored to the prewar landowners, which has led to multiple ownership of many tunnels albeit with access effectively being controlled by whoever owns the portals. Some tunnels, especially in and around St Peter Port, are now used for storage, while some have been reopened as public visitor attractions.

Visiting the Guernsey military works today

There are direct flights to Guernsey from UK and mainland European airports, and ferries from Poole, Portsmouth and (sometimes) Weymouth, and also from St Malo. Once on the island, the visitor finds reliable and regular bus services starting from the harbour and serving almost all parts of the island. There is of course a frequent bus service linking the airport and the town, a short run of a couple of miles or so. The majority of roads, especially those crossing the centre of Guernsey, tend to be narrow, winding, and picturesque.

Unlike Alderney, unrestricted access to military structures is very much the exception rather than the rule. Visitors should be aware that most are in private ownership and on private land, and that permission to visit should always be obtained. Several are now established as museums, and access to others is controlled by the Channel Islands Occupation Society and / or Festung Guernsey. Ownership of tunnels is often divided, length by length, between the landowners above.

There are several ferry sailings to and from Sark each day, so a day visit to the smaller sister island is feasible. However, there is little of military interest to see here, although there is a short 16th century rock-cut road tunnel with German modifications at the landing-place at Creux harbour, and at the remains of silver mines at Little Sark a tunnel of unknown origin was certainly used during the occupation. Other tunnels are at Stocks Meadow in the centre of the island; this is an unlined tunnel with two entrances accessed from a deep cutting. Although not mentioned in German records, it was excavated during the occupation but its intended use is not known. It seems likely however that it was intended to run to the German military headquarters at the Manoire, a distance of 250 metres. Another tunnel nearby was driven for 17.5 metres into the hillside at the rear of the Stocks Hotel. Again its intended use is not recorded but a tunnel between the hotel and the Manoire could have been useful to the Germans and the intention may have been to join this tunnel with the one at Stocks Meadow. The tunnel has now been renovated.

Accessible sites of interest

The main publicly accessible sites, more or less advertised throughout Guernsey, are named in **bold** type. Especially

noteworthy are Fort Hommet and the Pleinmont tower MP3 which are both superbly restored and re-equipped to give visitors an authentic view of what they were like in service, and how they worked.

Some but not all such sites are open more or less all day every day during the tourist season; some are manned only on selected days. Sites not named in bold letters are not generally open to visitors and enquiries about access should be made to Festung Guernsey or locally.

In and around St Peter Port

Guernsey's capital is more picturesque and perhaps less developed for mass tourism than St Helier in Jersey, with attractive narrow, steep and cobbled streets. Standing in the harbour, at the end of a causeway, is pre-Victorian **Castle Cornet**, a well-established tourist attraction, with museum displays, a tea room, gardens, and the inevitable shop. The entry fee could be considered a bit pricey, and there is next to nothing visitable 'underground'. In a quaint ceremony, a cannon is fired at noon every day.



The party gather for a photograph at Castle Cornet following the firing of the noon cannon.

On high ground to the south stands what remains of Fort George, although (as with Fort Regent overlooking St Helier on Jersey) the site has been extensively redeveloped, in this case with up-market housing.

Harder to find, and minimally advertised, is an impressively restored and maintained **German Naval Signals Headquarters**, in a quiet street, Saint Jacques, uphill from the harbour. This is a semi-subterranean concrete bunker, and was operational from 1 February 1944. Before that date, the facility operated (from 1942) from the adjoining La Collinette and La Porte hotels.

The structure comprises two sets of rooms linked by a short connecting tunnel. There is an associated detached generating bunker. This place handled all important German radio signals for the Channel Islands, especially after they were isolated following the Normandy landings. Enigma machines were used, with signals routed via Paris, and later direct to Berlin. Rooms restored and re-equipped as far as possible to their wartime state include the Operations Room, Signals Operator's Room, Transmitter and Teletype Rooms, Radio Room, Officers' Bedroom, and services.

The bunker has been restored by the Channel Islands Occupation Society, and is open to visitors on Thursday and Saturday afternoons (14.00–16.30) from May to September, and Saturdays only in April and October. Group visits at other times can also be arranged. Contact www.occupied.guernsey.net. An eight-page information leaflet is available at the site.

By contrast there are two commercially operated and well-advertised tunnel sites close to St Peter Port reached in a few minutes' walking by taking the cul-de-sac road southwards from the harbour front.



The cross gallery at the rear of Ho 4 is now the main museum hall

The first to be encountered is the **La Valette Military Museum (Ho 4)**. This has been established in four parallel tunnels and a fifth unlined entrance tunnel each 4 metres wide and 60 metres long driven into the rising ground beside the road, with a lateral connecting gallery linking their inner ends. The tunnels were made by the Germans to house huge fuel storage tanks, three of which have been removed. In 1987 the site was converted into a military museum with storage chamber No 4 being opened up to create a new entrance and chamber No 1 being opened as an emergency exit. Before the museum could open, the remaining fuel tank had to be pumped out and filled with water. The museum opened in August 1988 and today's visitor can view as many bits of military paraphernalia as any sane person might want to see, from buttons and medals to documents and photographs and guns and knives.



The surviving fuel tank, now filled with water, is one of the museum exhibits

A short walk further takes you to the end of the road, which was to have continued along the coast via a short tunnel, which was driven in 1864, making it one of the few pre-German sites. The road was never continued beyond the south portal, which overlooks a steep drop to the rocky beach beyond. However, this tunnel was adapted by the Germans, who made a couple of blind-ended side tunnels to increase the storage capacity. This is now the **Aquarium Tunnel (Ho 8)**, and the entrance fee allows you to admire exotic fish and the like, although there is little of engineering or military interest visible behind the tanks. A small hammer and sickle symbol has been painted on the ceiling at one point. You may or may not be allowed to look out of the south end of the tunnel, where it can be appreciated why the 1864 road was left unfinished.

Storage tunnels Ho1, Ho2 & Ho3

Beyond these well-advertised tourist sites, there are others worth visiting where liaison with Festung Guernsey is needed to gain access. These include Ho 3, a large storage complex on the Val des Terres, Guernsey's motorcycle and car club hill-climb course. It is sited on the southern outskirts of St Peter Port a short distance from La Valette museum. The tunnel complex had two vehicular entrances either side of the Val des Terres hill. It was intended as a ration store and later a naval supply store; large quantities of flour sacks are the only supplies known to have been stored there. In 1944, following air attacks on Fort George, a German unit together with all its equipment was moved into the tunnels where they stayed in cramped conditions for several weeks.



The north entrance to Ho 3 on Havelet

After liberation, the tunnel was cleared and remained unused until October 1945 when it was opened as an unclaimed furniture depository by the Housing Authority for the storage of furniture removed from buildings that had been used by the Germans. Most of this had come from requisitioned buildings and houses that were unoccupied after the evacuation of many families to England in 1940. Within a few years, much of the furniture had been returned to its rightful owners and ownership of the main tunnel passed to the owners of the properties above.



Progressing along the tunnel large quantities of domestic junk have been stored

Today the northern entrance is adjacent to a private residence on Havelet (road) while the southern entrance is in the garden of 'Les Terres House' on Val des Terres, a steeply winding road rising south from St Peter Port to Fort George, with the main vehicle tunnel running below the corner of the hill.

The main tunnel is fully concrete-lined and remains in good condition – it is, however, blocked by walls and steel grilles where it passes under property boundaries. Our access point was through the open north entrance which is 4.9 metres wide and lined with plastic sheeting for the first 10 metres. Once inside the tunnel the first section is being used for storage but as we progressed through the tunnel it was clear that it was also being used as a dump for unwanted household items. After 24 metres the tunnel curved to the right for 10 metres before running straight for a further 18 metres; at this point a narrow pedestrian tunnel comes in from the right. It was stacked with rubbish sacks and gated but we could see daylight in the distance. This tunnel slopes downwards for 57 metres emerging in the garden of 'Les Terres House'. During the occupation the house had been commandeered by the Germans for the use of naval personnel from St. Peter Port Harbour and the pedestrian tunnel was built to allow them to use the main tunnel as an air-raid shelter. The main tunnel widened to 7.5 metres at the junction with the branch leading to the storage bays. This



About halfway along the tunnel we were halted by a secure metal grille and beyond it a block wall

2.5-metre wide unlined gallery has now collapsed or was blown up by the army after liberation. It ran for about 120 metres to an emergency escape shaft at the top of Le Val des Terres. In this side tunnel there were three or four storage bays on the right.

From the junction the main tunnel reduces in width to 4 metres and runs straight for a further 50 metres to the Val des Terres entrance but our progress was soon blocked by a stout metal grille so we retraced our steps.

Another storage tunnel Ho 1 is located behind property on Grandes Maisons Road in which Festung Guernsey's members maintain a workshop where large and small items left behind by the occupying forces are restored.

Ho 1 was the first large storage tunnel network to be built on Guernsey and, if it had been finished as planned, it was intended for the storage of diesel fuel for the island's main power station near St. Sampson harbour with barrels being transported between the harbour, the storage tunnels and the power station using the extensive 60 and 90cm rail network. Ho 1 was however never completed and the tunnels were only ever used for munitions storage. Work on Ho 1 commenced early in 1942. Two vehicle entrances linked by a semi-circular tunnel were excavated behind a bungalow called 'Stickledown' at the rear of a disused quarry in Grandes Maisons Road. A third personnel entrance was built in another old quarry off Dalancey Lane on the west side of Dalancey Hill. This ran under Dalancey Park to join the loop tunnel. A 60cm gauge railway linked all three tunnel entrances.



The north entrance to Ho 1

We were able to visit the two entrance tunnels behind Stickledown. The north tunnel entrance is 5.5 metres wide and is lined for the first 16 metres; it is currently used for storage. At the end of the lined section, the tunnel is fenced and we were unable to go any further. A much smaller unlined tunnel continues for a further 30 metres where it is blocked by a rock fall; beyond the fall the tunnel collapsed completely in 1987.

We retraced our steps to look at the southern entrance. This is also 5.5 metres wide and the concrete-lined tunnel runs for 40 metres to the base of a 2 metre square shaft with a steel rung ladder. This is the site of a collapse during the construction of the tunnel. Instead of filling



*Our way forward was stopped by a fence after 16 metres.
The smaller dimension unlined tunnel is soon
blocked by a roof fall*

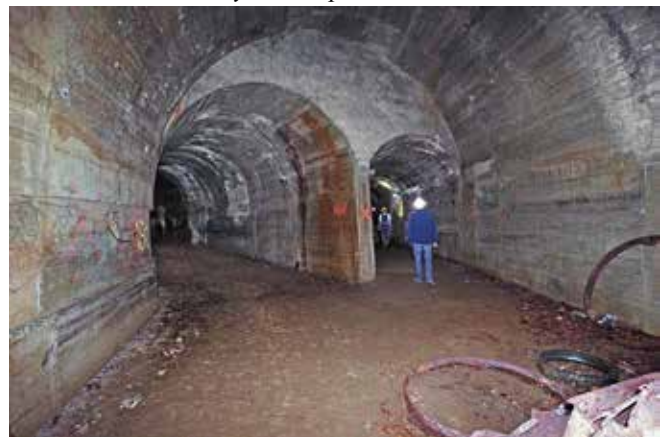
in the hole the Germans constructed an escape shaft and it is likely that this section of the tunnel was used as an air-raid shelter for the gunners of Batterie Sperber which comprised four 10cm Czechoslovakian field guns which were emplaced in casemates in the park.

The shaft was infilled from above in 1948 when local children started climbing down the ladder to steal apples from the Stickledown orchard. We were able to climb the ladder as far as the infill. Beyond the shaft, the tunnel width is reduced to 2.6 metres wide as, following the collapse, the Germans decided that it would be impossible to complete the tunnel at its full vehicle width to join up with the north entrance. The tunnel lining stops shortly beyond this point and further progress is blocked by a rock fall. The personnel entrance off Delancey Lane could still be entered as recently as 1974 but was blocked by a roof fall after 15 metres. Today the only evidence that it ever existed is part of the 60 cm railway embankment that served it.

Following liberation, the southern entrance was used by the British army to store unwanted German military



*The party approaches the middle entrance to Ho2 which is
now the only access point into the tunnels*



*The junction with the storage tunnels. The wider tunnel on
the left leads to the central entrance while the narrower
tunnel on the right leads to the storage chambers and the
now blocked personnel entrance to the north*

vehicles but these were removed for scrap in 1947 and since then the remaining lined sections of the tunnels have been used for storage.

German records show that during the construction of Ho 1, 10,598 cubic metres of rock were extracted and

2,781 cubic metres of concrete was poured which indicates the extent of the tunnel network must have included lined storage chambers. The existence of these was confirmed by a local man who was driving for the Germans near the end of the occupation. He remembers delivering ammunition to Ho 1 which was stored in lined chambers. It seems likely that the unlined sections of tunnel were blown up by the army as is known to have

At the end of the southern lined entrance tunnel to Ho 1 there is a now blocked escape shaft up to Delancey Park. This was created after the tunnel collapsed in 1943 and the shaft was used by the gunners of Batterie Sperber who used the tunnel as a shelter. Beyond this point the unlined tunnel is blocked by a roof fall below the bowling green in the park.



happened in Jersey. By 1947 the extent of the tunnels was little more than is accessible today.

Also driven into the rising ground on the outskirts of St Peter Port, behind a substantial metal fence and locked gate, is another large-diameter storage tunnel. Ho 2 had vehicular access and was designed for the storage of rations. Excavation of the tunnels started in February 1942 and continued around the clock until the autumn on 1943 when most of the workforce was recalled to France leaving the tunnel network in an unfinished state; a familiar story on Guernsey.

For most of its length, the tunnel was concrete-lined with two vehicle entrances. The northern entrance was at the rear of an old quarry at Le Bouet and is now behind postwar housing in St. Peter Port. The second entrance which is now the only access into the system is behind a warehouse on the Rougeval housing estate. A third personnel entrance was located to the west in the rear of another old quarry and now on the edge of the housing estate.

With the tunnellers back in France, no further work was undertaken and a decision was made to bring those sections of the complex that were completed or nearing completion into use. This meant that much of the system was abandoned without ever being used. The southern section of tunnel leading to the personnel entrance was walled off although a vent was left to aid air circulation. The three unlined storage chambers in the central section were bricked up. The unlined section of tunnel close to the Le Bouet quarry entrance was considered safe enough to use.

There are no surviving records that indicate what was stored in the tunnels but it is assumed to have been rations as originally planned.



Two of the remaining three lined storage chambers still contain rusting German equipment. Gun limbers now without their wooden wheels which have rotted away and field kitchens are seen here

On liberation, the tunnels were quickly emptied and, in 1946, a new use was found with Ho 2 being the first of the German underground complexes to be used for the storage of unwanted Germany military equipment including big guns, tanks, radar units, searchlights, gun limbers (carriages) and field kitchens. In the summer of 1947 many of the larger and more valuable items were removed for scrap. At this time, a number of rock falls were found in the unlined northern entrance tunnel and much of this was backfilled with earth.

The tunnels were opened to the public on the 50th anniversary of the liberation in 1995 and then resealed. Our access into the tunnel network was through the central entrance which is four metres wide. The entrance tunnel is 80 metres in length and curves to the right through 90 degrees to a junction with the storage tunnel. At this point, the main tunnel is 5.5 metres wide and it continues north for a further 80 metres towards the northern entrance. Five recesses have been cut into the north side wall; these may be the start of storage bays that were never built. After the 5th bay the tunnel curves to the right on the approach to the northern entrance but is blocked after 10 metres by a combination of rock fall and backfill. This extends for approximately 20 metres to the 12 metre-long lined entrance tunnel. Externally the entrance was covered by a landslide in 1994.

We retraced our steps to the junction with the storage tunnel which is 2.6 metres wide. As built, there were six storage bays here, three on each side. Three of these bays were still unlined when the tunnel was brought into use and they were walled up by the Germans. Subsequent explorers have broken through the brick walls but the storage chambers have now collapsed. The three remaining lined storage bays, one to the right and two to the left, remain in good condition and still contain a large quantity of German equipment that wasn't wanted



Looking north along the storage tunnel; the first of the storage bays is seen on the right. Rubble from the collapsed unlined storage bay on the left is seen straight ahead. The 'fire point' sign on the wall was painted by the liberation forces in 1945 during clearance of the tunnels

by the scrap man. This comprises mainly field kitchens, gun limbers and parts of searchlights.

The storage tunnel extends for 50 metres to where it was walled up by the Germans to seal off the abandoned southern section of the tunnel where there were further unfinished storage bays. A 50cm square hole was left in the wall for ventilation but the tunnel beyond has now collapsed.



The well preserved 4.7cm casemate at Halfway.

Note the range board above the gun position.

Further north along the coast road, near 'Halfway', is a small 4.7cm gun position, part of the Wn. Schonbucht-Mitte, overlooking the beach. This is a long walk or a short hop on a bus from St Peter Port, and maintained by Festung Guernsey, who keep a generator for lighting. It is impressively complete and restored internally. In fact in many such gun positions there is well-preserved internal wooden wall-lining and wartime German signage. This site is not generally open to visitors.

Several other tunnels, mostly not very interesting and full of modern junk, exist in and around the town. One such is of more interest, as it consists of a small set of narrow rock-cut air-raid shelter tunnels under the northern fringe of the Lower Lines at Fort George. The rock here appears to be a dark grey / black metamorphosed gabbro. The entrance is from a private garden at the rear of a house, so liaison with Festung Guernsey and the home owner is needed for a visit.

Central Guernsey

The **Underground Hospital** is a striking contrast to that on Jersey. Whereas the Jersey establishment is well lit with impressively presented displays and a modern shop and tea room, the Guernsey establishment is a large labyrinth of dimly lit damp tunnels with minimal displays at one or two points. Visitors pay for entry at one portal, wander at will, and exit via a low-key souvenir sales point at the other. The features and structures of the complex 'as built' can be well appreciated. It was here that the author found the only picture postcards depicting underground scenes on sale.

Not far away, and also well advertised, is the surface-only **German Occupation Museum**, a well-presented series of displays which does not neglect the realities of civilian life on the island under German rule. There is a small refreshment room and sales desk.



Guernsey 28: One of the 30.5 Cm ex-naval guns mounted at the Mirus Battery

An impressive site for which negotiation for access is essential is one of the two extremely large German gun positions, the Mirus Battery. The very large piece of ordnance could fire to all points of the compass, including right across the width of the island, but has of course long since been removed for scrap. However the very large gun platform remains in a circular concrete-lined pit connected to a number of underground rooms and a short tunnel equipped with narrow-gauge railway track. A second such site has been incorporated into a school's grounds.

West coast and southwest Guernsey



MP3 was built in 1942. The top three levels were used by the navy for their batteries. The two lower levels were taken over by the army for their two batteries of 22cm guns

The most striking monument here is the **Naval range-finding tower MP3** (Marinepeilstanden und Messstellen) near Pleinmont at the southwestern extremity of Guernsey. This is open to visitors at locally advertised dates and times (enquire at the Occupation Museum) and is impressively restored and re-equipped internally, with access to all floors. An enemy approaching from the sea

would first be engaged by the coastal artillery batteries. The control of firing on sea targets was established by triangulation from a series of naval artillery direction and range-finding towers. These were multi-storeyed buildings with each floor controlling a separate artillery battery: the location of the target was ascertained by taking compass bearings on it from two adjacent towers, the known distance between them forming the base of a triangle that together with the established angles enabled a simple trigonometric calculation to locate the target's exact position. The drawback to such a system was that it could not easily handle multiple targets; it would have been difficult, perhaps impossible, for an observer in one tower to ascertain that he was taking a bearing on the same target as his opposite number in the neighbouring tower.



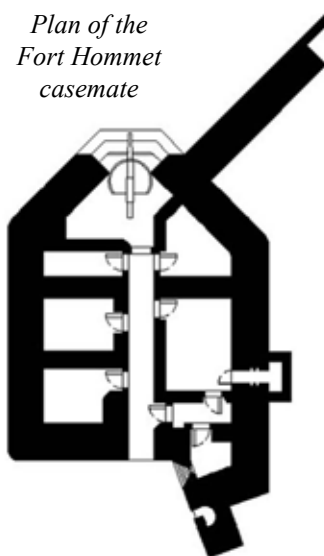
The ground floor of the superbly restored tower



The unusual offset design of MP4 is unique. It served the same purpose as the round range-finding towers. Built on five levels, each level was to have served one of the five naval gun batteries planned for the island. In the event only three naval batteries arrived, and the two other levels were used by the army. In the latter part of the war a Freya radar was mounted on the roof

Another tower MP4 (access unascertained) at L'Angle can be seen a short way further east along the coast. Although the tower, obviously, is not subterranean there is a small complex of underground rooms and tunnels (one of the gun positions) nearby, with unrestricted access. MP4 was the inspiration for the 2011 horror film 'The Devil's Rock'.

Some way from here, up the west coast, is **Fort Hommet**, impressively restored and re-equipped as at Pleinmont. The functioning of both these sites is enlightening for those who have hitherto seen only bare concrete walls and empty rooms in comparable structures. Fort Hommet was constructed on the Vazon Bay headland



in the late Napoleonic Wars era as part of the anti-French defences although there had been fortifications recorded here as far back as 1680. A Martello tower was built on the site in 1804 with further batteries and a barracks being added later. During the occupation a 10.5 cm gun emplacement, one of 21 such 'fortress bunkers' built on Guernsey was added to the fort. It is one of four at this location, built to deter beach landings. It was constructed from about April 1943, with walls two metres thick. By that date the military railway to bring in materials had been extended to Vazon.



Fort Hommet is seen on the headland and below the fort is the 10.5 cm German casemate

After Liberation all such bunkers were stripped of furniture and fittings by the British Army and by islanders, and all metalwork such as guns and doors was removed for scrap, and the sites buried and landscaped over. With re-awakened interest in the Occupation, all 21 of these sites were surveyed, and this one selected for restoration.

The entrance was re-excavated in 1993; the gun, doors, furniture and fittings replaced in 1994, and the public admitted from May 1995. Visitors can now see, within the nine cramped internal spaces, features such as the gaslock; crew standby room; and rooms for the extractor plant and shell and shell case storage. The gun now in place is a French-made Schneider field gun made in 1916. It could fire 15.74 kg shells a distance of eight kilometres.



The crew room

The area is now a peaceful place with reminders of the war scattered about the sand dunes: one wonders if the military personnel who manned it enjoyed ice creams on sunny days. As Britain elected not to attempt to retake the Channel Islands during the war, the men who manned this and all the other defensive works spent hours, days and weeks for nearly two years staring at the beach and never firing a shot in anger. An eight-page information leaflet is available at the site. Access is as for Pleinmont (above). Also here is a small **Shrine of the Sacred Heart**, to which there is free entry on selected Saturdays: it is a shell grotto constructed within a German bunker.

The final tunnel of the weekend was behind the Imperial Hotel at Torteval. This little known Hohlgangsanlage does not appear in German records but it is mentioned in the minutes of a meeting on 17 November 1942 to discuss the provision of emergency power generating stations in the Channel Islands. The tunnel has two entrances, one at the back of a small quarry behind the hotel and the other in the cliff face alongside Rue des Valniquets.



The junction near the end of the Imperial Ho, the lower entrance at the back of the quarry is behind the photographer, the upper entrance is to the left

The tunnel is unlined throughout and the size indicates that it was probably just a pilot tunnel and as such was another of Guernsey's many unfinished tunnels. From the back of the quarry the tunnel runs into the cliff for 27 metres to a blind end with a small side bay just inside the entrance on the right. Five metres before the end the tunnel branches to the left sloping upwards for 16.5 metres before turning sharply to the left to reach the upper entrance which has partially collapsed.

Dedicated telephone network

All the German military installations were joined by a dedicated telephone network with the main cables buried two metres deep to prevent damage. These ran from Pleinmont in the southwest across the centre of the Island to Chouet in the north. Four heavily protected network junction bunkers were built along the route. These also acted as repair centres for field telephones and equipment; all four still exist. The bunker at Torteval was used by Guernsey Civil Defence as a nuclear monitoring post but has now been vacated and is used for storage as are the other three bunkers which are all privately owned.



The Torteval Network Junction bunker



Where possible German artefacts were left in place by Guernsey Civil Defence who previously used the bunker. There are numerous signs around the walls which have not been painted over and some original ventilation trunking and overpressure valves. The box seen here appears to be of top quality with PVC cable insulation, which must have been fairly new at the time. This appears to be a break-out point where pairs of a multicore telephone cable could be 'broken out' to provide access for individual speech pair, presumably for connecting to individual telephones. There is remarkably little corrosion to the brass or bronze screws, which attests to the airtight seals of these cast-iron cable termination boxes

Festung Guernsey and the Channel Islands Occupation Society

Festung Guernsey is evidently a small band of passionate activists who have secured access to several sites, and restored and secured them. At some they keep portable generators to allow lighting for visitors and for their own work; in one tunnel they have a well-equipped workshop for restoration work.

Acknowledgements

My visit to Guernsey was a ‘fringe’ event arranged between a small group of members, not an ‘official’ event advertised to the membership as a whole. It has for twenty or thirty years been Subterranea Britannica policy to encourage members to arrange such informal visits, on the understanding that those taking part are not covered by the society’s insurance arrangements and do not seek to be seen to be acting on behalf of it. The arrangements

were made with his characteristic efficiency by member Brian Hillman with, as on the official Jersey visit in May 2012 (see *Subterranea* 30), an excellent choice of hotel. Few of the site visits would have been possible without the splendid assistance of several members of Festung Guernsey.

Suggested further reading: *German Tunnels in Guernsey, Alderney & Sark* - Festung Guernsey October 2012. 350pp [ISBN 978-0-9549334-4-9] Heavily illustrated with plans and photographs. Only available from Festung Guernsey. £15.95 plus postage.

GAVEY, Ernie – *A guide to German Fortifications on Guernsey* – Guernsey Armouries July 1997 (revised 2001) 88pp [ISBN 0-9531631-05] £9.99 from Amazon

Additional text on the exploration of the tunnels by Nick Catford. All photos Bob Clary.

Reed Flute Cave

China

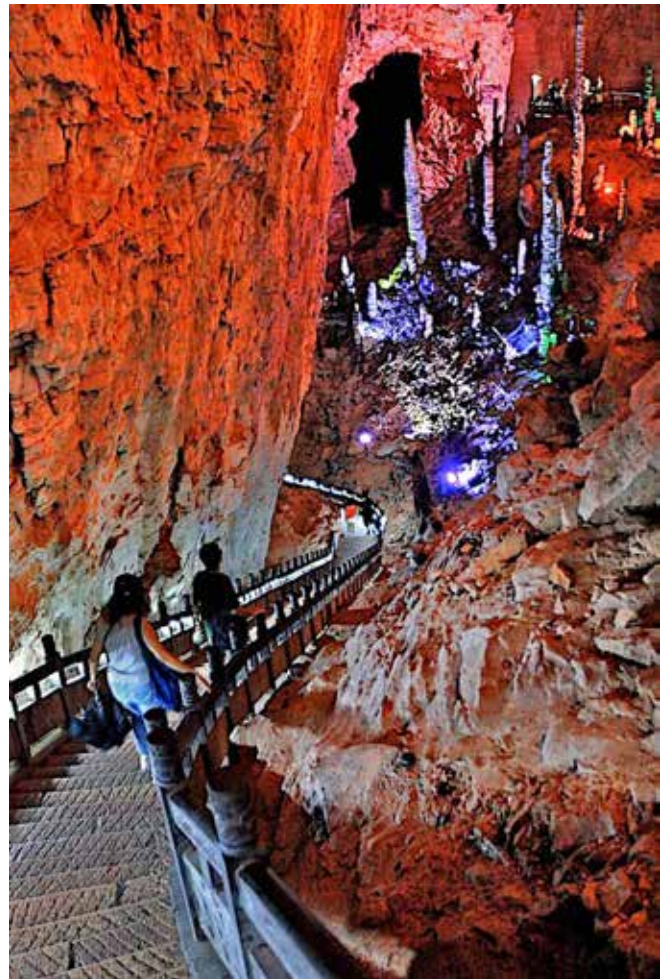
Julian Allason

You won’t find any reeds or flutes outside Ludi Yan, the Reed Flute Cave, near Guilin in southern China, northwest of Hong Kong. Just the usual rabble of vendors pressing postcards and unspeakable viands upon visitors. The limestone interior – all 250m of it – is another matter, with grottoes, tunnels, stalactites and stalagmites reflecting in the clear subterranean lake.

The inhabitants of Guangxi province have been sheltering, marrying, conducting magical ceremonies and, it is said, orgies, in here for millennia. Graffiti dates from the Tang dynasty of 792 AD, written records from much earlier, while the formation is estimated to be 180 million years old. Given the geology it is likely that the full extent of the cave system extends considerably further than that presently open to inspection. Not that freelance exploration is encouraged without the appropriate paperwork, likely to involve refreshment of officials.

“There will be silver service and plenty of wine – Chinese wine,” Mr Wu says proudly, gesturing to the tables being laid in the Crystal Palace of the Dragon King for a dinner. This is a quarter of a mile underground and not far from Guilin, a city more usually associated with the karst limestone peaks enclosing the Li-Jiang, China’s most atmospheric river.

Here we are some way off the track usually beaten by western tourists. But not the Chinese visitors now rediscovering the ancient glories of their country, and like this wedding party, doing so in some style. We make way for a white-gloved steward weaving between stalactites to set candelabra upon the top table.



Living underground

Twin pressures are reacquainting the Chinese with the ground beneath their feet. The first is the shortage





of land for a rising population, and inflating property prices. An astonishing thirty million Chinese are now reported by the *Los Angeles Times* to live underground, principally in porous regions like Shaanxi province. Cave houses are often dug into the side of a mountains, and have the benefit of being warm in winter, cool in summer. And cheap.

The evolution of a prosperous – and educated – middle class with a passion for Chinese history is also fuelling an exploration of their own country above and – more cautiously – below ground. Pagodas sacked by the Red Guards in the Cultural Revolution of 1966 to 1970 are being restored, complete with cellar networks, and ancient Buddhist monasteries repopulated with monks. Some of the cultural treasures now re-emerging in China were, like the mystical landscape embracing Guilin, just too large to be vandalised by the Red Guards. Or too useful: the Reed Flute Cave was designated an air-raid shelter, and part of it sectioned off for unspecified military use.



Now they are viewed by central government as evidence of the superiority of Chinese civilisation, and by local authorities as a means of attracting visitor revenue. “Tourism – the new opium of the people . . .”, murmurs my guide. Maybe so, but certainly an intoxicant for westerners in search of the ‘lost’ China, especially those with an underground bent.

Guilin and Guangxi province are in the semitropical south, adjoining Vietnam. From Banyan Tree Lake at the centre of this leafy provincial town arise twin pagodas, monuments to its 2,200-year history. These

are its highest buildings, save the *Waterfall Hotel* which has a cataract cascading down its glass sides.

Above the meandering streets of shop-houses tower limestone karst pinnacles, weathered almost vertical by time. They are said to be riddled with caves, the current usage being the subject of local speculation. Cable ducts may be seen entering some of the lower-level ones, and antennae emerge higher up. Those in search of tranquillity climb the thousand steps of Solitary Beauty Peak, or a little further out, scale Folded Brocade Hill. From Catch Cloud Pavilion at the summit an eerie landscape of serried pinnacles marches out to a violet horizon. The effect is of inhabiting a Song dynasty watercolour.



In a country of massive and continuing migration from countryside to cities it is difficult to underestimate the tidal pull of the ancient landscape, of which underground rivers and cave systems occupy an essential part of the mythology, although exploration remains cautious, often conducted under academic auspices. With an increasing proportion of Shanghai’s population of twenty million affluent enough to travel, the search is on for what they refer to as ‘Zong Guo’, literally the Middle Kingdom, but also a cautious euphemism for ‘old China’.

Part of that embraces the part of history considered ‘safe’ for discussion, in which tunnels, caves, and underground rivers are presented not as the abode of demons but in their earliest practical incarnation as storage places and retreats from invasion.

What is not spoken of is the use to which they were put during the troubled twentieth-century turmoil of civil war, the Long March and Mao’s catastrophic Cultural Revolution when populaces retreated underground. More comfortable then to consider them as venues for celebration and wonder, nowhere better than at the Reed Flute Cave.

GETTING THERE

Best season: October to March.

Reed Flute Cave is 4 miles northwest of Guilin and can be reached by tourist bus 3 or 58.



Seaton ROC Post

The underground post that was built twice

Lawrence Holmes



Seaton brick-built above-ground post at the Seaton Down Hill site. Note the post hut on the right. The pile of debris on left might be the material from the nuclear post excavation which could date the photo to c1959

The Seaton Observer Corps post opened in August 1940 at NGR SY 240899 almost on the seafront at Beer Road, Seaton, Devon. The post was designated S3 in 22 Group Exeter. All Groups in the Observer Corps had the status of a Group within RAF Fighter Command.

The post structure consisted of a raised observation area some ten feet square with a small cubby at the side to give the observers some protection from the weather and provide a place to brew tea and prepare food. A Chief Observer was appointed and a crew of up to 16 members was recruited from the local area. The observers were a mixture of full time (type 'A') and part-time (type 'B') although the duty crew was normally only two observers.

Duty throughout the war

Their role was to report all aircraft movements in the vicinity of the post, which was normally a ten-mile radius, 24 hours a day, 365 days a year. This continued until the end of WWII. Although radar had been invented, most radar installations were located on the coast and pointed outwards. At this stage of the war, radar was still not good at picking up tracks below 5000ft and radar could not recognise the type of aircraft.

The Seaton post was equipped with a post plotting instrument which enabled the observers to ascertain the grid position of each aircraft. The observers assessed the height, direction of flight and aircraft type and numbers. Most observers were experts at aircraft recognition. The post was also equipped with a post telephone which enabled reports to be sent to the main Operations Room at Exeter where tracks were plotted on a large flat plotting table. This enabled officers to give warnings of air attack, to the public. All tracks were passed on to the RAF so that interceptions could be made and enemy aircraft shot down.



Aircraft reporting post at Seaton with the post crew. This is probably the wartime crew or from the late 1940s

In April 1941, for its valuable services in the Battle of Britain, the Observer Corps became the Royal Observer Corps (ROC) and also women were allowed to enrol in the Corps from that date. In 1941/42 the ROC was given air force-style uniforms for the first time.

In 1943 the post was equipped with Totter rockets. On seeing an enemy aircraft the post observers would fire off the rockets to indicate to friendly patrolling fighters that an enemy was in the vicinity and should be intercepted. In June 1944, possibly for operational reasons, the post was resited just under a mile to the northwest to a field to the west of Seaton Down Hill. This new post was at NGR SY 23389116 and the post was redesignated to G1, still in 22 Group Exeter.

New location

The old post structure on the seafront at Seaton was demolished and a new brick-built post with an adjacent post hut was constructed in the farmer's field. The post, with its prominent position overlooking the English Channel, must have been extremely busy around the D-Day period, plotting the many aircraft and no doubt looking at the vast array of ships crossing over to France. Seaton was not involved in plotting the V1 menace and as the Allies advanced further into Europe air activity must have lessened considerably.

With the end of WWII in Europe, the ROC stood down on 12 May 1945. All the telephone lines were switched off and many of the wartime observers left the ROC for good. WWII had finally ended, of course, with the detonation of nuclear weapons on Hiroshima and Nagasaki and with the V2; the world had been introduced to the intercontinental ballistic missile.

However, on 1 January 1947, the Corps was reformed,



this time with a low-level aircraft reporting role. The West had become very concerned at the spread of Communism and about the possibility of nuclear war with the Soviet Union. The Corps was needed to pick up any low-level Soviet intruders possibly carrying nuclear weapons.



Part of the roof of the nuclear post broken into 'accidentally' by the contractors in 1979/80

Third designation

All the old post sites were reactivated and communications re-established. Many of the wartime members of the Corps did not want to rejoin the reformed Corps and new members had to be recruited. After WWII one big difference was that the Corps was only parttime, administered by only a small number of full-time officers. The former wartime post at Seaton was opened up again and in September 1949 the post was redesignated to T1, still in 22 Group Exeter.

From 1947 onwards the Corps trained by holding about six exercises per year when all the operational systems were set up and tested. From 1947 to about 1955 these were aircraft reporting exercises only; from 1955 to about 1962 they were combined aircraft/nuclear, but from 1962 onwards the exercises were totally nuclear.

In the reorganisation of November 1953 Seaton post was redesignated to K3 but now in a reshaped 9 Group Yeovil. In 1955 the Home Office asked the ROC to become the field force for the United Kingdom Warning and Monitoring Organisation (UKWMO) and take on a nuclear reporting role. From this date onwards the aircraft reporting role was phased out as the nuclear role came in.

New underground bunker

From 1958 the Corps gradually built protected underground bunkers for all its posts and some of its Operations Rooms which it now called Controls. The underground post at Seaton was built in 1960 immediately adjacent to the above-ground post and consisted of a concrete bunker some 3m by 6m by 2.5m high, three feet below ground. The bunker had a fallout protection factor of 1000. Nuclear instruments were placed above ground with meters and dials to read underground.

The new role at Seaton was to record and report various

items of data so that the position and power of any nuclear weapon detonated within the vicinity (30 miles radius) of the post could be calculated. This data included the peak over-pressure of the blast wave and the bearing, elevation and spot size of any burst, and also whether the 'spot' was touching the ground or not. An additional role was to take five-minute readings of the levels of fallout at the post site to enable fallout maps to be constructed in the Controls. In yet another reorganisation in October 1968 Seaton post was redesignated to G2 still in 9 Group Yeovil.



The start of the new excavation



The top of the monitoring room being reconstructed in 1980. The turrets have just been started

The old aircraft reporting post at Seaton was not demolished until the late 1970s. Bill Anderson was the DGC at 9 Group Yeovil in 1979 and following an instruction from Southern Area HQ, Bill sent a works order to a local contractor to demolish the above-ground post. Because there was also an underground post nearby, Bill emphasised that it was *only* the above-ground post which had to be demolished.

Clearly some misunderstanding

Bill was then posted to 15 Group Lincoln. Basil Wright had only just been appointed as a full-time Officer at Yeovil HQ as DGC, when one Sunday lunchtime he received a phone call from Ch/Obs Allan Trott of Seaton Post telling him that the Seaton underground post had been lost! Basil immediately went to the post site to find only levelled ground where the nuclear post had been in the farmer's field. On the face of it the nuclear post had indeed disappeared!



Basil then phoned Allan Trott again and arranged to meet him at the post site the next day. It was there that they discovered that local contractors had been appointed by the MoD to demolish the nearby old Seaton above-ground aircraft reporting post. By mistake, or over enthusiasm, they not only demolished the above-ground post but partly demolished the nuclear post as well.

Before demolishing the nuclear post they had cleared the monitoring room and toilet of all the internal fittings and equipment. The contractors then smashed an access hole in the roof of the nuclear post and then pushed all the material from the demolished surface post into the bunker. They smashed off the two surface turrets putting that debris into the nuclear post as well. The whole site was levelled and covered in soil so that no sign of either post remained!

There was clearly embarrassment all round. Basil Wright on behalf of the ROC contacted the contractors and explained their mistakes and they immediately agreed to return all the equipment they had removed from the underground post. They also agreed to clear out the monitoring room of the underground bunker which was largely still undamaged.

Incompetence or theft?

At this sensitive stage Basil was contacted by the local police who said they were going to charge the contractors with the theft of the ROC equipment they had taken from the underground post. This was partly because the same contractor had been vaguely implicated in shady dealings before. Because Basil was to collect all the equipment the next day, the Police decided to drop these particular charges. In the first part of 1980 the inside of the post was cleared, the roof to the underground post made good and both turrets were rebuilt.



The new bunker almost completed

The whole post was refurbished, painted and re-equipped and late in 1980 the post members took over their now brand-new nuclear post again. As far as is known it is the only ROC nuclear post which was built twice on the same site!

Seaton also now had the distinction of being the second to last underground post to be built. It was beaten by Ambergate which was built in 1982 as a replacement

for Ripley which was closed due to the realignment of the A38.

The post members were most upset by this occurrence because they had just won the 'Best Post in the Cluster Award'. To aid with the faster routing of nuclear information, in 1981 the Corps introduced data transmission and all post designations were changed to numeric. In what was to become the last redesignation, Seaton became 51 post, still in 9 Group Yeovil.



Seaton post crew standing around the nuclear post entrance hatch in the 1980s.

The last post

In 1989 communism began to collapse, the Berlin Wall came down and with it the threat of nuclear war with the Soviet Union diminished. The Government of the day stood down regiments, squadrons, ships and almost all of the ROC. The posts and controls of the ROC stood down on 30 September 1991. Seaton post closed and it is thought the nuclear bunker was demolished in the late 1990s.



In 2011 Seaton Town Council responded to a request to name a street in honour of the Royal Observer Corps

Nothing now remains at Seaton of any of the ROC posts used between 1940 and 1991. But the presence of the ROC is well remembered by the sign describing the role of the Corps at the Picnic Area, and the road near the Tesco superstore is called 'Royal Observer Way'.



